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AUGUST 1991 • ISSUE NO. 44
Please display until August 13

LEARN INTARSIA STEP-BY-STEP
See page 28

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See page 36

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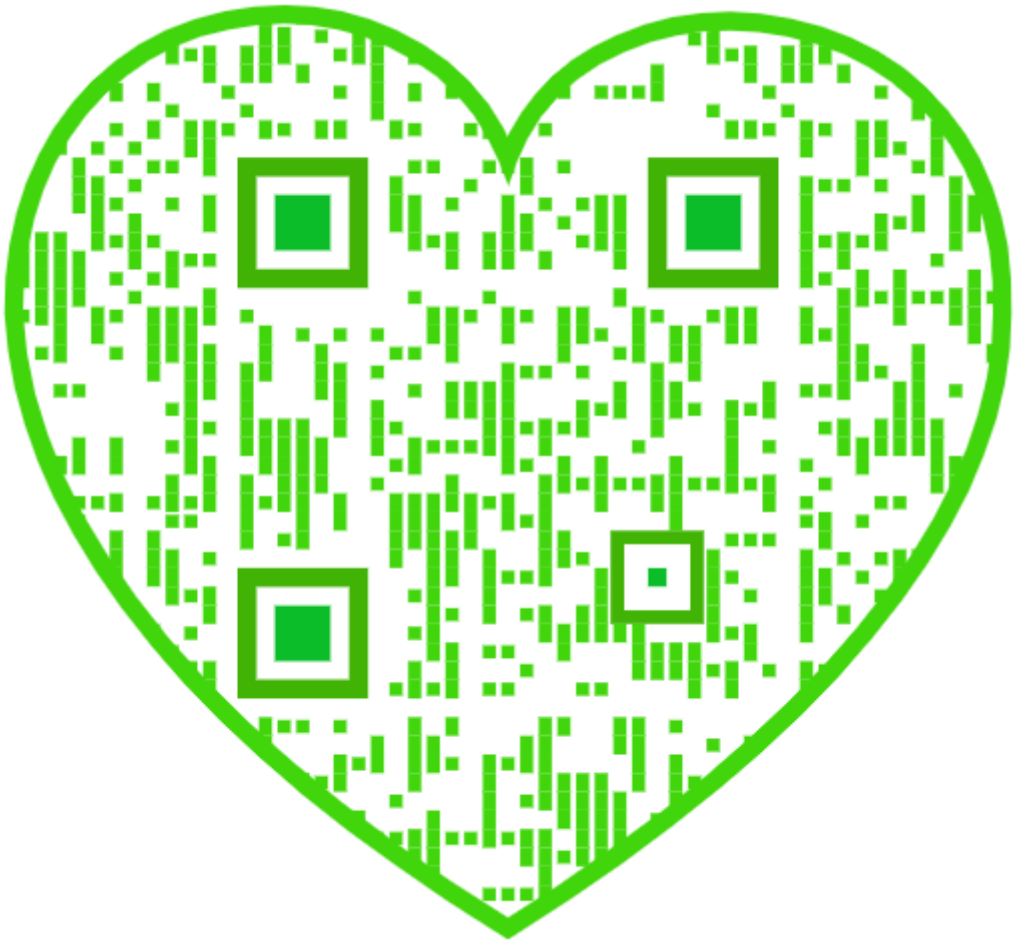

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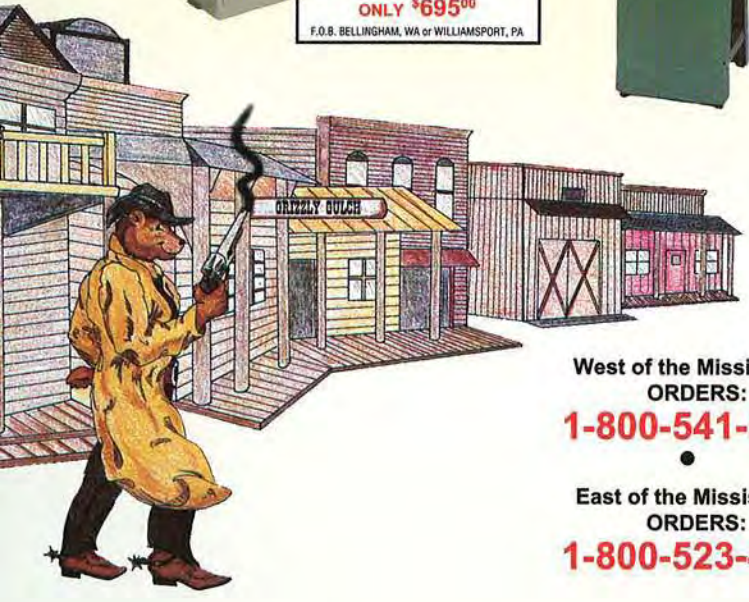

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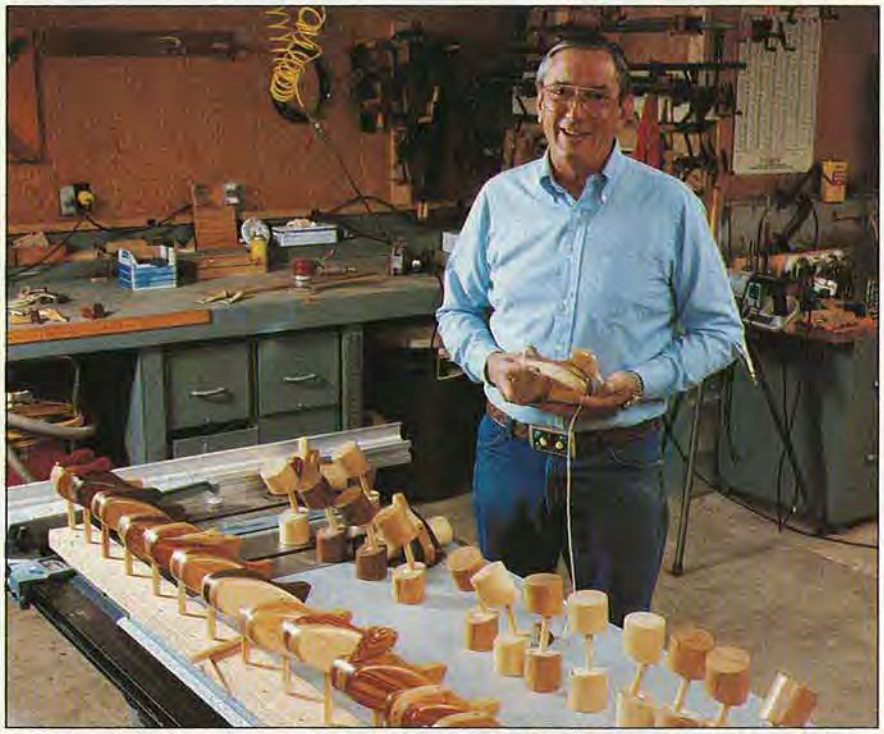
THE FLY-BY-NIGHT GANG

THE EDITOR'S ANGLE

GOOD ENOUGH FOR THE BOARD OF DIRECTORS



Ted Meredith, a *WOOD*® magazine reader who literally has all of his ducks in a row, takes a moment to admire his latest creations.

One of the really neat things about *WOOD* magazine readers is that many of you take the time to let us know what you're up to. In fact, hardly a day passes by that we don't hear about someone's woodworking heroics. And believe me, we appreciate receiving every one of those calls, cards, and letters.

Not long ago, I got a call that I just couldn't resist following up on. It was from the wife of one of our loyal readers. She told me that her husband was just about done building 16 Waddles-the-Duck pull toys, one of the Design-A-Toy winners featured in our October 1989 issue. And when she mentioned what he was going to do with them, I just had to go check things out. It turns out that her husband was looking for just the right gift to present several business associates as a thank-you for serving on his company's board of directors. And after giving it some thought, he decided on Waddles.

Why a project from *WOOD* magazine? Maybe it's time I told you a bit more about this involved reader. He's Ted Meredith, chairman of the Executive Committee at Meredith Corporation, the company that owns *WOOD* magazine. Ted, who reads every issue from cover to cover, thinks that Waddles will serve as a great little sample of what his company is all about.

Now, how's that for a satisfied *WOOD* magazine reader!

Larry Clayton

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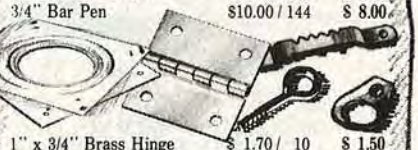

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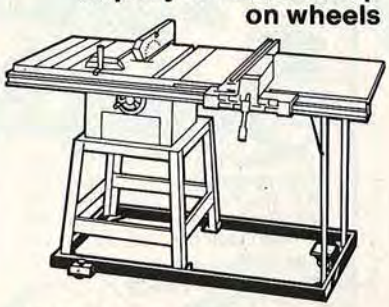

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This issue's cover wood grain: sassafras *Cover photo: Hopkins Associates*

AUGUST 1991 ISSUE NO. 44

WOOD PROFILE

Redwood: the forest's elder statesman 21

With some trees rising 30 stories high and living over 2,000 years, this mighty species has supplied builders and woodworkers for centuries.

CRAFTSMAN CLOSE-UP

Hawaii's calabash king 23

What do George Bush and Mikhail Gorbachev have in common? They both own large, lidded calabash bowls turned by native Hawaiian Stewart Medeiros.

SHOP-TESTED TECHNIQUES

Intarsia—the Judy Gale Roberts way 28

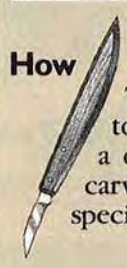
Learn the cutting and sanding techniques of this exciting branch of woodworking from one of the very best, and get two terrific patterns!

Ready-reference calender/clock 34

Stay up to date and on time with this handy desktop project. Start by ordering the calender/clock movement from our buying guide.

Three-of-a-kind Southwest tables 36

With this distinctive trio of projects that includes a coffee, end, and sofa table, you can set a relaxed, friendly style for your living or family room.



How to shop smart for carving tools 42

The pros know the secrets of choosing and buying the right tools, and now you will, too. Four renown carvers—each favoring a different style—share tool tips. So whether you prefer power carving, relief carving, or carving in the round, this story has your special interest in mind.

CARVING
Nature's-goodness wall plaque 48
Oh, what a relief, featuring words of prayer that surround a colorful carving of nature's bounty—bread, fruits, and grains. For speedy results, order either the presawed blank or routed roughout in basswood or butternut.

Just plane propellers 52
For 60 years, the Sensenich Propeller Company of Lancaster, Pennsylvania, has built high-quality wooden propellers for fliers the world over.

Tiny-tyke toolbox 'n' tools 56
Let your little woodworkers enter the world of make-believe with this fun-filled toy wooden toolbox and hand tools. Find the patterns inside.

The write stuff 60
Embarrassed by the look of cheap plastic pens? Try making your own from your favorite hardwoods using either a drill press or lathe. Order the pen parts from our source.

THE CRAFT SHOP
Wily fox weathervane 62
Placed on a roof or post, this crafty canine points out the way of the wind.

Country wagon 64
It's little, but it's loaded with charm.

Resplendent pendant 66
Have fun making this gift, and still more fun giving it away.

Home brews for your shop 68
Make up some nonpolluting concoctions for your woodworking needs.

SHORT-SUBJECT FEATURES

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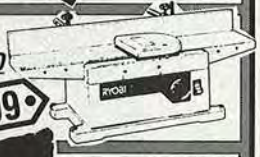

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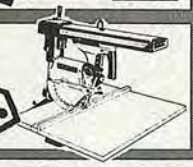

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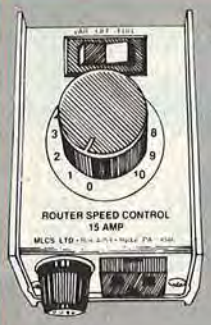

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#602		3/16" Spiral Cutter		3/16"	5/8"	1/4" *	$12.00
#603	Solid Carbide	1/4" Spiral Cutter		1/4"	3/4"	1/4"	$12.00
#903		1/4" Spiral Cutter		1/4"	3/4"	1/2" *	$12.00
#904		3/8" Spiral Cutter		3/8"	1"	1/2" *	$24.00
#905		1/2" Spiral Cutter	*Proper Adaptor Will Be Supplied	1/2"	1 1/2"	1/2"	$29.00
#350		1/8" Round Over	1/8" R	3/4"	3/8"	1/4"	$11.00
#351		3/16" Round Over	3/16" R	7/8"	1/2"	1/4"	$11.00
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#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	$21.00
#199		Multiform Moulding	Unlimited Patterns	2 1/4"	2"	1/2"	$40.00
#340		1/8" Cove	1/8" R	5/8"	3/8"	1/4"	$12.00
#205		1/4" Cove	1/4" R	1"	1/2"	1/4"	$12.00
#206		3/8" Cove	3/8" R	1 1/4"	9/16"	1/4"	$13.00
#207		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	$14.00
#208		3/4" Cove	3/4" R	1 7/8"	3/4"	1/2"	$26.00
#460		1/4" Bull Nose	1/4" Dia. of Circle		3/8"	1/4"	$14.00
#461		3/8" Bull Nose	3/8" Dia. of Circle		3/4"	1/4"	$15.00
#462		1/2" Bull Nose	1/2" Dia. of Circle		7/8"	1/4"	$16.00
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#507		5/8" Pattern	Flush Trim	5/8"	1"	1/4"	$16.00
#508		3/4" Pattern	Flush Trim	3/4"	1"	1/4"	$17.00
#366		1/8" Slot Cutter	3/8" Deep	1 1/4"	1/8"	1/4"	$14.00
#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	$14.00
#204		3/8" Rabbeting	3/8" Deep	1 1/4"	1/2"	1/4"	$13.00

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#212		1/2" Core Box	round nose	1/2"	1 1/32"	1/4"	$13.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	$15.00
#213		1" Core Box	round nose	1"	3/4"	1/2"	$17.00
#214		1/4" Straight	plunge cutting	1/4"	3/4"	1/4"	$ 6.50
#215		5/16" Straight	plunge cutting	5/16"	1"	1/4"	$ 6.50
#216		3/8" Straight	plunge cutting	3/8"	1"	1/4"	$ 6.50
#217		7/16" Straight	plunge cutting	7/16"	1"	1/4"	$ 6.50
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	$ 7.00
#775		1/2" Straight	plunge cutting	1/2"	2"	1/2"	$14.00
#218		5/8" Straight	plunge cutting	5/8"	1"	1/4"	$ 7.00
#219		3/4" Straight	plunge cutting	3/4"	1"	1/4"	$ 9.50
#220		1" Straight	plunge cutting	1"	1 1/2"	1/2"	$11.00
#500		3/8" Flush Trimming		3/8"	1/2"	1/4"	$ 7.00
#502		1/2" Flush Trimming		1/2"	1/2"	1/4"	$ 7.50
#503		1/2" Flush Trimming		1/2"	1"	1/4"	$ 8.50
#221		1/2" Flush Trimming		1/2"	1 3/16"	1/2"	$ 8.00
#545		Tongue & Groove	Straight	15/8"	1"	1/4"	$29.00
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#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	$13.00
#453		5/16" Beading	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#530		3/16" Edge Beading	3/16" Dia. of Circle		1/2"	1/4"	$15.00
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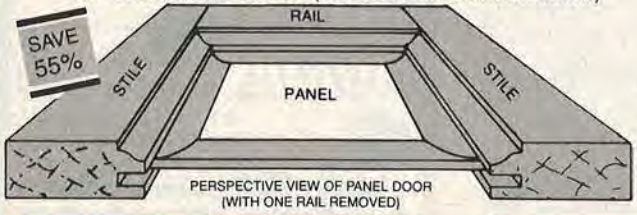

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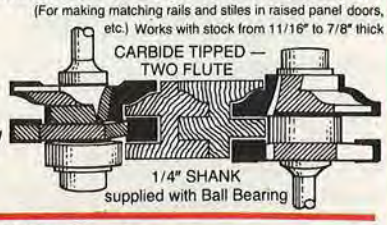

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THE #1 MAGAZINE FOR HOME WOODWORKERS

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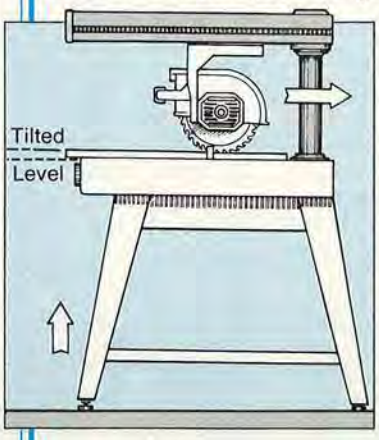
When your saw's on the move, makeshift adjustment is no solution

I take issue with the radial-arm saw tip you published in the January 1991 issue. Any radial-arm saw that moves on its own is in need of much more attention than David M. Johnson suggests. It is in serious misadjustment and very dangerous. The only correct remedy is to readjust the carriage roller tension. Anyone who owns a radial-arm saw should read the book "Fine Tuning Your Radial Arm Saw," by Jon Eakes.



—Michael Griffith, Milwaukee, Wis.

Michael, thanks for writing. Several readers wrote to recommend Eakes's excellent book and to recommend against making any makeshift corrections on the radial-arm saw, which they agreed could be dangerous.

Help for those cutting coves with 8″ or 9″ table saws

In your January 1991 issue, you published an article titled "Large-scale Moldings." In it, everything is based on a tablesaw with a 10″ blade. Is there a mathematical formula I could use on your guide to cutting coves to adapt it to my 8¼″-saw?

—Christopher Wheat, Enfield, Conn.

Chris, we received a similar request from a reader with a 9″ saw. You'll need to put an 8″ blade on your saw to use our amended table. Refer to the cove-cutting chart on page 40 of that January 1991 issue. Substitute these figures for the column marked "fence angle."

To cut cove radius	Fence angle for 8″ blade	Fence angle for 9″ blade
¾″	23°	22°
1″	26°	25°
1¼″	30°	28°
1½″	35°	32°
1¾″	37°	38°
2″	41°	40°

We shoulda measured thrice, checked twice, printed once

There's egg on our collective face, and that's no yolk, folks. At least 30 readers wrote to tell us of errors in our answers to the Woodworking I.Q. test that appeared on page 78 of the February 1991 issue. Some teased us, others simply corrected us, but happily, no one was nasty.

We goofed, giving you wrong answers for questions one, three, and four. You challenged us on several others. We promise to do better.

Regarding question No. 1 [What size is a board foot?], 1 × 6 × 18″ is only 108 sq. in. A board foot equals 144 sq. in. [Thus B and C are correct]. It's a good thing that you are not trying to sell lumber.

—B.J. Eagen, Ottawa, Ont.

Question No. 3 asks how long it would take, according to the old adage, to air dry a piece of green wood that is 3½″ thick. At the rate suggested in your answer, two years for the first inch and one year for each additional inch, that would require 4½ years, which wasn't among the answer choices.

—Max Tony, Winston-Salem, N.C.

The three answers offered to question No. 2 [What's the greatest difference between red and white oak?] were pretty lame. The major difference is that red oak has open cells while white oak has closed cells, making it useful for casks and able to withstand the rigors of the outdoors.

The answer to No. 4 [After seasoning, will a board be narrower or shorter than when it was green?] is incorrect. Although wood shrinks most appreciably in its width and thickness (7-14%) it also shrinks a few tenths of 1% in length. Thus the correct answer is C. Both.

—Thomas A. Volz, Claremont, Calif.

Answering question No. 11 [When is a dado a groove?], you say "A dado goes across the grain; grooves, with it." The grain direction doesn't make any difference. A dado has parallel sides and a flat bottom. A groove can be V-shaped, round-bottomed, or like a dado. A scratch is a groove.

—Ronald Furchtenicht, Pine Springs, Minn.

WOOD *magazine's building instructions call for a groove when referring to a flat-bottomed channel that runs with the grain and a dado when referring to one that runs across it. Those aren't universally accepted distinctions—our project builder, Jim Boelling, agrees with you. However, John L. Feirer, in his widely-used text* Cabinetmaking and Millwork, *says: "A dado is a groove cut across grain."*

Continued on page 8

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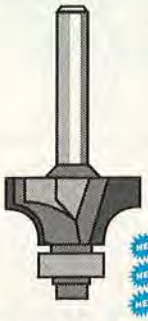

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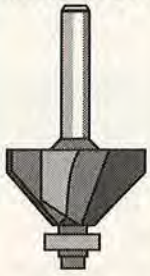

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TALKING BACK

Continued from page 7

Reader has reservations about Toth's Oklahoma observations

In response to the article about Peter Wolf Toth in the April 1991 issue, I and many other Oklahomans were offended by his statement: "Eventually (the Indians) were shuffled onto reservations, often worthless land, like in Oklahoma."

He should do a little more homework. While there are lands in Oklahoma that are owned by Indians and by the various tribes, no reservations exist in this state. If he thinks the land is worthless, he should pay us a visit. Oklahoma's primary source of income has been from the land—farming, ranching, and extracting petroleum.

Being both a native American Indian and an Oklahoman, I feel that Peter Wolf Toth owes this state an apology.

—Mike Talley, Oklahoma City, Okla.

Forstner bit update

Enjoyed your February 1991 Forstner bit buymanship article. You mentioned that CONVALCO was the only manufacturer of Forstner bits in 1/16" increments. Not so. Greenlee also makes such bits, sold only by Silvo Hardware [Milwaukee, Wis.]. At Long Beach City College in the cabinetmaking/woodworking shop, they have a complete set of these bits. I have used several of them, and found them to be excellent.

—Roger Wright, Long Beach, Calif.

You're right, Wright. Our contact at CONVALCO was mistaken, and none of the other manufacturers in our catalog library offer such bits. Our Products and Techniques Editor Bill Krier, who wrote the article, said he hadn't previously heard of Greenlee or Silvo Hardware.

Boil walnut husks, strain, and stain

In soaking black walnuts before planting them (this encourages germination) I notice that the soak water becomes black. Do you know of a recipe for making stain out of nutshells?

—R.L. Matson, Falconer, N.Y.

Your soak water may contain enough pigment to stain with, particularly if you concentrate it by simmering. Our ancestors made walnut stain for wood and fabric by boiling the husks (we'd use an enamel pot), and then simmering them over low heat for a few hours before straining the mash from the stain. Apply and reapply the stain until it's dark enough. As with any water-based stain, expect some grain raising and thus extra sanding.

Depletion of forests will be a worldwide tragedy

I'm no environmentalist, just a woodworker who respects wood's origin. I may not be around when the last tree is standing, but when it does happen, the news will be worse than any war, or economic or political tragedy. It will be a world tragedy. *WOOD®* magazine covers subjects on replanting, searching waterways for washed up wood, even going into the forest for workable fallen trees. I just hope that this will not only prevent another acre of woods lost, but will actually gain one back.

—Robert Gilly, Albany, La.

Thanks for writing, Bob. Because WOOD *is printed on paper, and our readers are passionate users of wood; and because we are residents of this planet, who just plain like trees, we share your concern about the depletion of the world's forests.*

Formula demystifies ratings in horsepower vs. amps

In reference to the question in the February 1991 issue, here's a formula that will help compare tools rated in horsepower with those rated in amps.

Where E = Volts (usually 110 or 220)
I = Amps
W = Watts
Hp = Horsepower
1 Hp = 746 watts
The base formula is $W = E \times I$

If we had a 3-horsepower device, by using the formula, we find $3 \times 746 = 2238$ watts. By converting the formula, we get $I = 2238 \div 110$, or I = approximately 20 amps.

—Clif Stewart, Kuna, Idaho

"Pipefitter's" solution to clamping

Regarding your February 1991 clamp guide, rather than having 10 ¾" pipe clamps of different lengths, I have the following: four sets of ¾" pipe clamps, four 24" lengths of black ¾" pipe, four 30" lengths, two 36" lengths and eight ¾" threaded couplings. If I need to have a long clamp, I can thread the black pipe together to longer lengths. I save on storage space and can handle smaller jobs with shorter lengths.

—Warren Schreiber, East Long, Mass.

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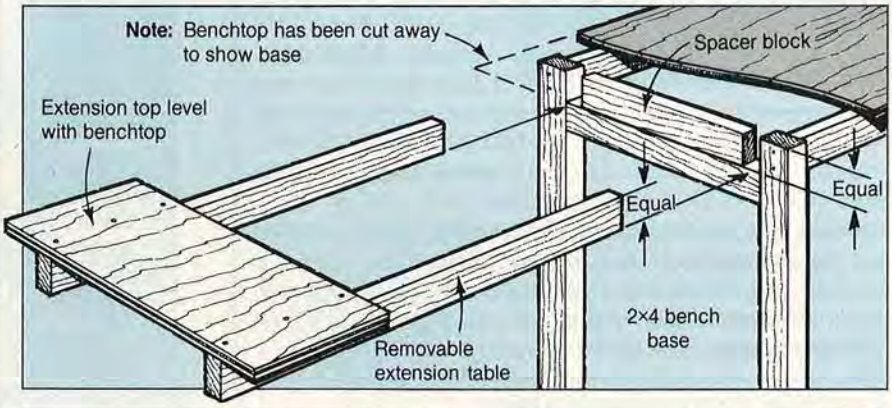
Bench extension reaches out to meet project needs

A regular-length (5' or 6') workbench is fine for most jobs. Sometimes, though, a longer one is handy, especially when you're working with sheet materials or long boards.

TIP: Build a sliding extension for your bench. Construct it as shown below from plywood and 2×4s or adapt it to match your bench design. Make the sliding panel so it will be flush with the benchtop when closed. For a heavy-duty extension, add a provision for auxiliary legs on the slider.

—Bill Selkirk, Plattsburgh, N.Y.

For his tip, Bill receives a Sears Craftsman 16" variable-speed scrollsaw, model 113.23618, *right*.

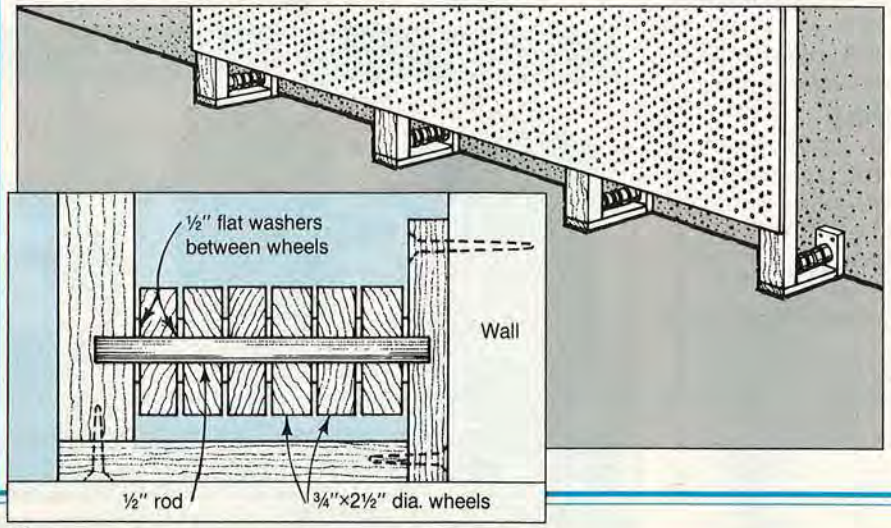


Storing big sheets easier with rollers

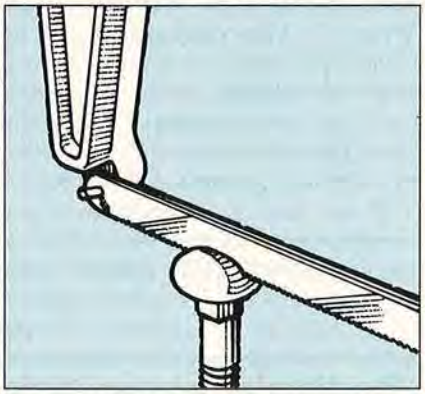
Wrestling sheets of plywood in and out of tight storage spaces is not only tiring, it's also likely to damage the edges of the sheet.

TIP: Improve your plywood storage area by incorporating rollers like those shown below. Cut the wheels from ¾" stock with a 2½" holesaw and put them on wood or metal axles. Now, you can easily slide individual sheets in or out of the storage slot. In this case, we placed a new 2×4 framework about 6" in front of a wall. Perforated hardboard on front holds tools and makes space for sheet material behind.

—Mick Dirr, Cincinnati, Ohio



Widening the gap for screwdriver blade



You need a screwdriver slot in a piece of hardware. Unfortunately, a hacksaw cut is going to be too narrow for the screwdriver blade.

TIP: Make a wider slot by putting two blades in the hacksaw frame when you make the cut. If you need a really wide slot, try adding another blade to the stack.

—James Lee, Lawrenceburg, Tenn.

Continued on page 12

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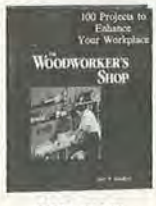

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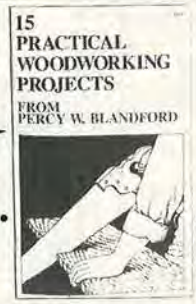

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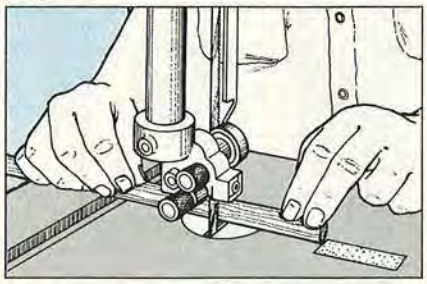
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 10

Masking-tape shortcut makes short cuts easier



You're working on a project which calls for a number of same-sized short dowels, but measuring and marking them for cutting is seriously slowing your pace.

TIP: Measuring from the blade, mark the desired length on the saw table with a piece of masking tape. Line up the end of your dowel with the guiding edge of the tape and make your cuts.

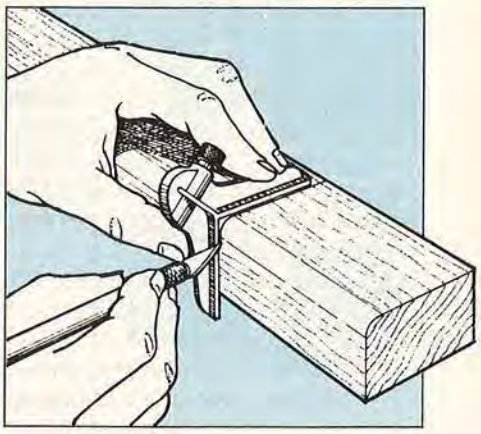
—From the WOOD magazine shop

Centering head takes lines around corners

Transferring layout lines from the face of a board to an edge often causes trouble, particularly with a rounded or chamfered edge.

TIP: Slide the rule out and put your combination square's centering head on the job. Align it with the layout mark and square it to the board. Now, mark the new line. For greatest accuracy, make your marks with an X-acto knife or sharp scriber.

—Dave Gorman, Corunna, Ontario

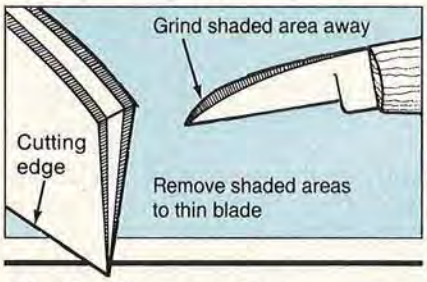


Modified blade makes carving knife better

The thick, wide blade on your new carving knife is unwieldy in tight areas.

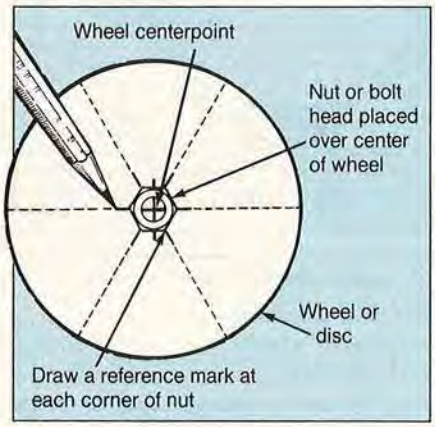
TIP: Grind the sides and tip of the blade as shown *below* on a slow-speed water wheel or grinding stone. While you're thinning the blade, round over the top edges, too. The reground blade will still be plenty strong and a whole lot easier to use.

—Harley Refsal, Decorah, Iowa



Divide disc equally with nut and bolt

You're trying to lay out equally spaced holes around a wheel without a dividing head or protractor. The task is becoming a challenge.



TIP: If you need three or six divisions, you're in luck. Grab a hex-headed bolt that fits through the axle hole, insert the threaded end, and secure the bolt with a nut. Now, extend a line from each hex point to the edge of the wheel. For three divisions, just mark at alternate points.

—Howard Gaston, Naples, Fla.

Continued on page 14

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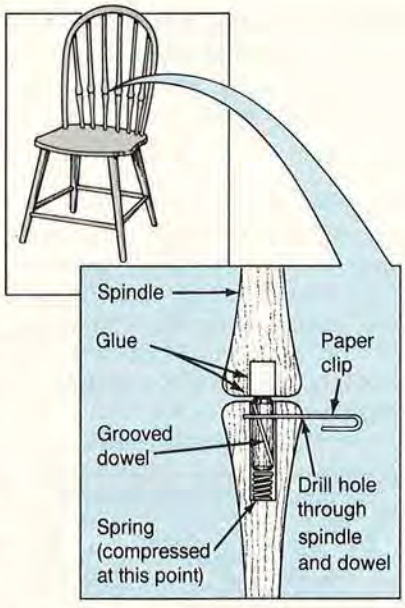
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 13

Dowel springs to action for easier spindle repair

Sometimes you can glue a broken chair spindle back together, but the repair may need reinforcement. A whole new spindle may be called for. In either case, you'd like to do the job without taking the entire chair apart.

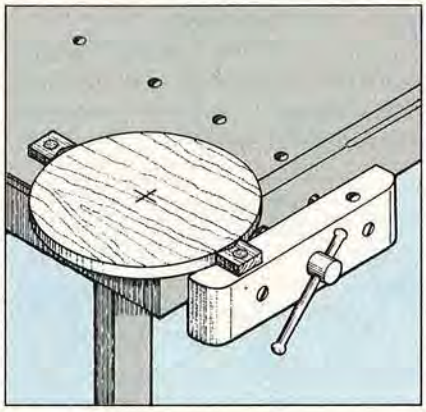


TIP: A spring and a dowel can save the day. First, remove the broken spindle. If it can be saved, modify it as shown in the drawing, *right.* If it is beyond help, make a two-part replacement with the joint shown. Test before assembly. With the dowel, a strong spring, and the paper clip in place, glue and reinsert the lower spindle section. Next, glue and reinsert the top spindle piece and glue the dowel joint. Align both spindle parts, and then pull out the paper clip. The spring will force the dowel into place, making a strong joint.

—Walter Kalinowski, Elizabeth, N.J.

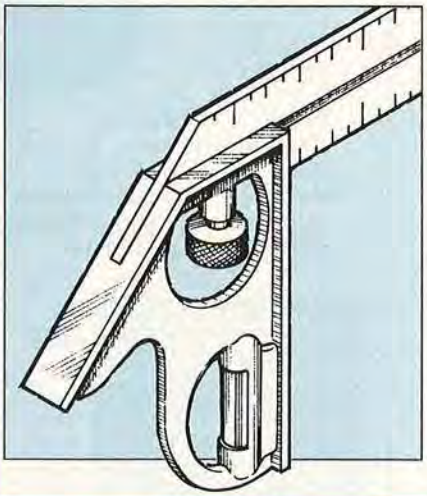
Notched bench dogs bite into round work

Bench dogs are great for holding straight-sided work, but they tend to lose their grip when faced with curved surfaces.



TIP: Cut V notches on one edge of your bench dogs, as shown *right.* The extra contact points will grip odd-shaped workpieces better, including those hard-to-hold circular shapes.

—Billy Gene DeSoto, New Iberia, La.



A new angle for an old square

You have some 135° angles to lay out. Fiddling around with the protractor and a straightedge is pretty clumsy, though.

TIP: Add another angle to an old combination square. Grind the corner of the blade as shown in the drawing, *left.* Now, just set the angled end of the modified blade flush with the 45° side of the head and you'll be ready to measure that obtuse angle.

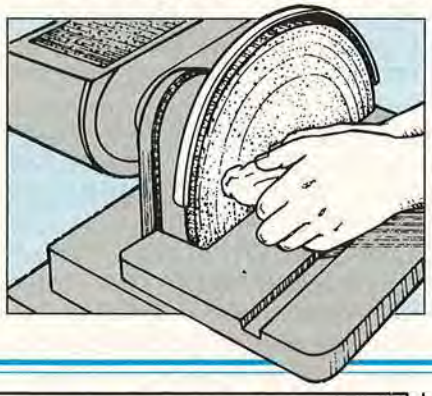
—Clay Addison, Charlotte, N.C.

Dried-up silicone caulk cleans up abrasive

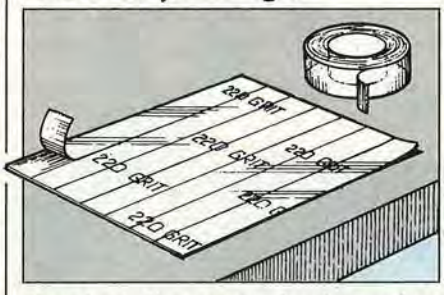
That partial tube of silicone caulk from last fall set up. Now, you have a big chunk of cured caulk that you may as well throw away.

TIP: While you can't stop drafts and leaks with it any longer, that caulk can still serve you in the shop. Strip away the tube and clean your abrasive belts or discs with the solidified silicone.

—Robert Thompson, Buckeye Lake, Ohio



Reinforced sandpaper sticks to job longer



Hand-sanding curved edges often tears the sandpaper to tatters long before the abrasive wears out. The paper lasts longer with a sanding block, but you need flexibility.

TIP: Stick plastic package-sealing tape to the back of your sandpaper. It will then have the strength to take on the rough spots and sharp edges while remaining flexible enough to take the curves.

—John Walsh, Martinez, Ga.

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- Solid-wood tabletops expand and contract seasonally. Our slotted cleats and the fastening method shown on page 38 let the top move without pulling out screws or splitting.
- To rabbet a panel too large for cutting on your tablesaw, check out the router and edge-guide setup we employed on page 41.
- See how Jim Boelling, our project builder, combines a jobber's stick and hotmelt adhesive to hold small pieces safely for routing. Turn to page 67.
- Even if you don't follow our fox plan for a weather vane, add our easy-rotating mechanism to your design. It's actually a toilet-float rod. See page 63.

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PRODUCTS THAT PERFORM

Print this article

Flexible foam block meets durable sanding belt

I liked this tool a lot. I enjoy using sanding belts for abrasive work because they hold up, but I previously lacked an appropriate block.

The foam BeltBlock I tested, designed for use with standard 3 × 24″ sanding belts, featured just the right combination of flexibility and firmness. It fit my large hands well.

The belts slipped on and off with ease, making it a snap to change grits. And, the price was right.

—Tested by Steve Oswalt

BeltBlock, 3 × 24″, $11.50 ppd, Fritchle/Ward Industries, 993 So. Santa Fe, Suite C-224, Vista, CA 92083. Other sizes available upon request.

Furniture repair kit in a box

During our testing, Amity Permafuse Repair Kit components mixed easily. Like epoxy, the two-part product is composed of a resin and a hardener, and despite printed warnings about vapors, the odor wasn't overpowering like similar products.

The kit, which Amity says will make "dozens of repairs," includes instructions, dyes, fillers, measuring cups, mixing sticks, a quart of resin, 8 ounces of hardener, and syringes.

By adding the filler you can plug nail holes, cracks, or gouges in wood. Add more filler, it becomes putty, useful for making replacement furniture pieces.

The filler creates quite a bit of fine dust when dumped into the mixture, however.

Without fillers, the product works as an epoxy-like adhesive.

The dyes provided in the package mixed easily into the material. Concentrated, a small amount goes far. Like other liquid furniture repairs, the material has no grain, so no matter how well you match color, matching the actual wood look proves next to impossible.

My shop was on the cool side the day I used Permafuse, and that may have affected working and drying time. Once mixed, it remained workable twice as long as the 30 minutes promised, but it took eight, rather than the stated six, hours to dry tack-free.

The best use for Permafuse, in my opinion, is for patching flaws in projects that you intend to paint. I also was confused by the inconsistent information accompanying the product. While the brochure says the material has a shelf life of three years, the instruction sheet says one year.

Perhaps the nicest thing about the product, is that it cleans up easily with water before it hardens.

—Tested by Steve Oswalt

Permafuse Repair Kit, $45 ppd. from Amity. C.O.D.'s are an additional $5. To order call 800/334-4259.

Adjustable countersink bits leave wide range of options

Made for screw sizes #5, 6, 7, 8, 9, 10, and 12 (you choose the length), this 22-piece set by HSS lets you drill and countersink holes for tapered wood screws. Each of the seven bits comes with an adjustable stop collar. The set tested made fast, clean holes, and proved reliable and consistent for drilling and countersinking.

During use, I experienced no chatter, a problem with some countersinks. The hex wrench supplied to adjust the countersink collars didn't fit the hex screws snugly on a number of the collars. This frustration led to the partial stripping of the set screws and some slippage of the stop collars and depth sets until I realized that I wasn't setting the stops tightly. I'd suggest throwing away the supplied wrench and using instead your own 2.5-mm wrench. Mine fit perfectly, even in the screws HSS's wrench wouldn't tighten. The maximum recommended spindle speed is 450 rpm for hardwood and 875 rpm for softwood.

—Tested by Steve Oswalt

HHS tapered drill/countersink/stop collar set, $33.99 ppd. from Dollar Trading Corp., P.O. Box 68666, Indianapolis, IN 46268, or call 800/666-7227.

Continued on page 18

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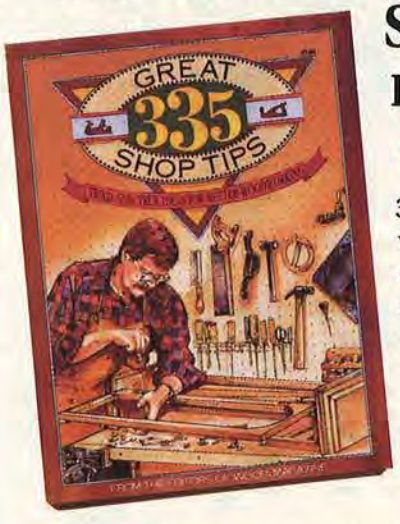

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	ST219	3/4	3/4	1/4	8.95
	ST406	1/4	3/4	1/2	5.50
	ST408	5/16	1	1/2	5.50
	ST410	3/8	1	1/2	5.50
	ST413	1/2	1	1/2	5.50
	ST413L	1/2	1-3/16	1/2	6.95
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	ST416	5/8	1-3/16	1/2	7.50
	ST419	3/4	1-3/16	1/2	8.95
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PRODUCTS THAT PERFORM

Continued from page 17

Basic bandsaw videotape

The Jet Tools Bandsaw Video aims at the first-time bandsaw user. Techniques and adjustments are shown on Jet's bandsaw, but most of the information is universal. It contains most of the rudimentary information and techniques a bandsaw user needs, such as blade installation and adjustment. Some basics—like adjusting for blade lead when ripping—are missing. Still, the rookie stands to learn a lot both about his tool and its operation by watching Jet's video. Host Buck Evans, more at home with the bandsaw than the television camera, gets his message across anyway.

—Tested by Steve Oswalt

Jet Tools Bandsaw Videotape, $10.50 at local Jet Tools distributors.

Comfortable block scraper smooths the way

This hardworking 3" hand scraper looks and feels good and should appeal to woodworkers who still on occasion cling to those old hand ways. The replaceable blades held up to a lot of wear. I used the tool to smooth a shelf, and it worked great cleaning up planer marks. I also used it to successfully remove glue from a glued-up panel. The blades don't have a burr on them like most scrapers do, and hence they don't cut as aggressively. The scraper also doesn't reach into corners. That's a problem with most other scrapers and even sandpaper. Blades change easily and lock with a set screw. The handle comes in walnut or cherry.

—Tested by Steve Oswalt

Handy-Block, $33.90 ppd., with four blades, from Handy Tool Co., Star Rt. Box 58, Deerfield, VA 24432 or call 703/939-4539. Set of five replacement blades, $2.50 ppd.

Versatile router-bushing set

This bushing kit, which includes a router baseplate, centering pins and four bushings, helps you more precisely use your router and templates. The centering pins, which fit ¼" collets, ensure exact centering of bushings. The bushings are 5/16", 7/16" regular, 7/16" long, and ⅝".

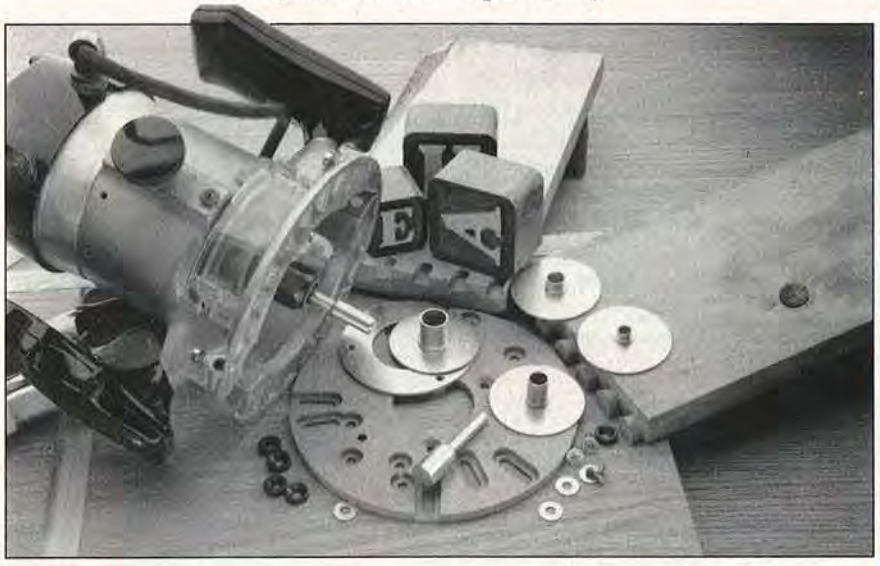
Used in tandem, a pair of these bushings can help you route a figure in a piece of wood, then fill it perfectly with a contrasting piece.

They'll serve you well for making dovetail joints, using a dovetail jig, or following any sort of template. However, many of us use them only occasionally, and buying them separately forces you to pay top dollar.

With the universal router base and bushing kit, which comes with four bushings, you pay only slightly more than the price of some single bushings on the market. Its baseplate fits my Sears router and the supplier says it fits most routers except Bosch.

—Tested by Steve Oswalt

Universal router base and bushing kit, item No. 96354, $15.99 ppd. from Leichtung Workshops. Call 800/321-6840 and ask for Dept. 121.



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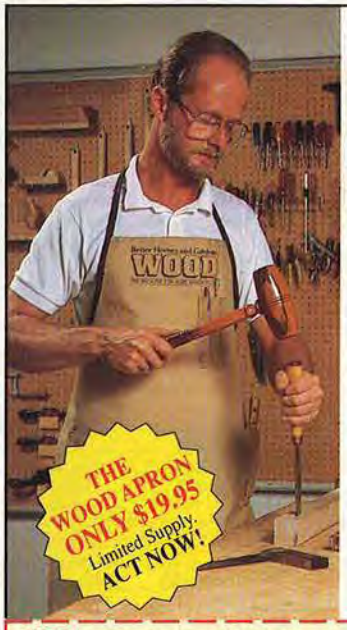

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5007NB	Makita 7-1/4",13A,*	$112.00
5008NBA	Makita 8-1/4" 13A,* ,Brake	$158.00
6365	Milwaukee 7-1/4",13A,	$118.00
345	Porter-Cable 6" Saw Boss,9A,	$99.00
315-1	Porter-Cable 7-1/4" Top Hdl,13A	$115.00
617	Porter-Cable 7-1/4" Push Hdl,13A	$115.00
5150	Skil 7-1/4",10A,	$49.00
5510	Skil 5-1/2",6.5A,,6-1/2 lbs	$99.00
5550	Skil 7-1/4",13A,* ,Lt. Wt.	$94.00
5656	Skil 7-1/4",13A,* ,	$109.00
5660	Skil 8-1/4",13A,* ,60°bevel -NEW-	$138.00

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5077B	Makita 7-1/4" Hypoid,,Elec. Brake	$138.00
6377	Milwaukee 7-1/4",15A Worm-Drive,	$168.00
314	Porter-Cable 4-1/2" Trim,4.5A,	$125.00
77	Skil 7-1/4",13A,Diamond Arb.	$144.00

Jig Saws,Variable Speed

4301BV	Makita 3.5A,4-Orbit,Case	$155.00
7549	Porter-Cable 4.8A Top Hndl,-NEW-	$139.40
7649	Porter-Cable 4.8A Barrel Grip,-NEW-	$159.00
4580-02	Skil 3.5A,6-Orbit,Case	$89.00

Reciprocating Saws

6511	Milwaukee 4A,Two-Speed,Case	$129.00
6527	Milwaukee 8A,Vari-Speed,Case-NEW-	$165.00
9629	Porter-Cable 8A,Six-Speed,Case	$135.00

Miter Saws

34-080	Delta 10",13A,	$195.00
LS1030	Makita 10",12A	$225.00
LS1440	Makita 14",12A	$435.00
TS251U	Ryobi 10",12.5A	$178.00
TS380	Ryobi 15",15A	$378.00

Compound Miter Saws

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36-040	Delta 8-1/4",9A,**	$159.40
C8FB	Hitachi 8-1/2",9.5A,** ,*	$445.00
LS1011	Makita 10",12A,**	$449.00
TS200	Ryobi 8-1/4",8A	$149.00

Belt Sanders

9030	Makita 1-1/8"x21",4.2A	$149.40
9924DB	Makita 3"x24",7.8A,**	$145.40
9401	Makita 4"x24",8.5A,**	$165.40
360	Porter-Cable,3"x24",10.5A,**	$174.00
362	Porter-Cable,4"x24",10.5A,**	$184.00

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BO4510	Makita 1.8A Palm,1/4 Sheet,	$54.00
BO4550	Makita 1.6A Palm,**	$58.00
9045N	Makita 4A,1/2Sheet,**	$129.40
6016	Milwaukee 1.8A,1/4 Sheet	$49.00
6014	Milwaukee 5A,1/2 Sheet	$118.00
330	Porter-Cable 1.2A,1/4 Sheet	$55.00
505	Porter-Cable 2.3A,1/2 Sheet	$112.00
S500A	Ryobi,1/6Sheet	$39.40
7575	Skil 1.9A,1/4 Sheet	$44.00

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9207SPB	Makita 7", 6.5A,Sand/Polish,2-Speed	$139.40
6140	Milwaukee 4-1/2",5.5A,Snd/Grnd,	$89.00
6066	Milwaukee 7"/9",15A,Snd/Grnd,	$147.00
7334	Porter-Cable 5",3.7A Sander,	$118.00
7335	Porter-Cable 5",3.7A V.S Sander	$129.00
9611	Skil 4-1/2",6A Grinder,12,000 rpm	$69.40

Laminate Trimmers,1/4" Collet

TR6	Hitachi 4A,30,000rpm,Guide.	$94.40
3700B	Makita 3.3A,28,000rpm,Guide	$99.90
7310	Porter-Cable 5.6A	$89.00
97310	Porter-Cable 5.6A Full Kit W/Case	$185.00

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6402	Makita 3/8",5.2A,0-1,200rpm	$94.40
0224-1	Milwaukee 3/8",5.4A,0-1,200rpm	$113.00
0228-1	Milwaukee 3/8",3.5A,0-1,000rpm	$98.40
0234-1	Milwaukee 1/2",5.4A,0-850rpm	$112.00
1660-1	Milwaukee 1/2",7A,HoleShooter	$169.00
1675-1	Milwaukee 1/2",7.5A,HoleHawg	$249.00
6225	Skil 3/8",3.0A,0-2,500rpm	$39.40
6635	Skil 3/8",5.0A,0-1,200rpm	$99.00
6650	Skil 1/2",5.0A,0-850rpm	$104.40

Hammer Drills Rotary Drills

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DH38YE	Hitachi 1-1/2" Rotary ,8A,Case	$399.00
H65	Hitachi 39lbs. Demolition Hammer	$549.00
HP1030	Makita 3/8",4A,0-2,700rpm,Case	$109.00
HP2010N	Makita 3/4",6A,0-2,300rpm,Case	$165.00
5392-1	Milwaukee 3/8",5A,0-2,500rpm,	$109.00
5370-1	Milwaukee 1/2",5.4A,0-3,600 rpm	$189.00

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630	Porter-Cable 1/2",1HP	$119.00
690	Porter-Cable 1/2",1-1/2HP	$124.00
691	Porter-Cable 1/2",1-1/2HP,D-Hdl	$134.00
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3612BR	Makita,1/2",3HP	$179.90
693	Porter-Cable 1/2",1-1/2HP,	$163.00
7538	Porter-Cable 1/2",3-1/4HP	$235.00
7539	Porter-Cable 1/2",3-1/4HP, V.S. NEW	$259.00
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RE600	Ryobi 1/2",3HP,VS	$205.00

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0375-1	Milwaukee 3/8",3.5A,0-1,300rpm	$139.00
3107-1	Milwaukee1/2",4.5A,0-750rpm,Case	$189.00

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6820V	Makita 5.2A,0-4,000rpm,	$83.40
6753-1	Milwaukee 3.5A,0-4,000rpm	$84.00
6750-1	Milwaukee 5.0A,0-4,000rpm	$89.00
6901	Skil 4.2A,0-4,000rpm	$69.00

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1900BW	Makita,3-1/4",4A,HSS Blades, Case	$118.00
9118	Porter-Cable HSS-Spiral Cut, 7A, Case	$189.00
1550	Skil,3-1/4", 3.6A, W/ Carb. Blade	$109.00

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N3804A	Narrow Crown Stapler 1/4" 18ga staple	$299.40

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32-100PJ	Delta Stationary	$299.00
JS100	Freud,5A,Case	$184.00
555	Porter-Cable,5A,Case	$189.00
1605-02	Skil,6A ,Case -NEW-	$139.40

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22-540	Delta12",15A -NEW-	$418.00
P12R	Hitachi 12", 15A -NEW-	$699.00
1P12RA	Hitachi 12"/6",Planer/Jointer -NEW	$879.00
2012	Makita 12",12A	$468.00
2040	Makita 16",2HP,13A-NEW	$1394.00
AP10	Ryobi 10",13A	$354.40

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0385-1	Milwaukee	7.2	0-600	NO	$114.40	48-11-0130	$48.00
0395-1	Milwaukee	9.6	0-350	NO	$149.40	48-11-0080	$55.00
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EY571BC	Panasonic***	9.6	50-350/150-1,000	YES	$139.40	EY970B	$44.40
EY6205BC	Panasonic	12	50-350/150-1,000	YES	$189.90	EY9001B	$54.00
9850	Porter-Cable	12	0-400	NO	$134.00	8500	$35.00
TFD170VRK	Ryobi	9.6	0-400/0-1200	YES	$149.40	1400123	$44.40
TFD220VRK	Ryobi	12	0-400/0-1300	YES	$169.40	1400143	$49.40
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REDWOOD

The forest's elder statesman

The giant of all nature's plants, the coastal redwood of California and Oregon can tower to the height of a 30-story building. Inland, the Sierra redwood—though not as tall as its cousin—grows to immense circumference. In California's King's Canyon National Park, for instance, the General Ulysses S. Grant redwood contains enough wood to build 60 five-room houses! That Sierra redwood ranks as the world's second oldest living thing. Only an ancient bristlecone pine in the mountains above California's Death Valley surpasses its 32 centuries. Even the coastal species can survive 2,200 years.

Regardless of the Sierra redwood's massive size, it's the coastal redwood that lumbermen have harvested since 1777. That's when Indian workmen felled redwood trees in the hills around San Jose to provide the wood for the Spanish mission at Santa Clara.

Wood identification

As its name implies, the commercially important coastal redwood (*Sequoia sempervirens*) grows in a narrow, coastal range from southern Oregon to California's Monterey Bay. This mountainous habitat feeds necessary moisture through frequent rains and fog.

Coastal redwoods, with their thick, cinnamon-colored bark and small, flat green needles, grow from tiny seeds. In prime conditions, this fastest-growing conifer produces as much as 400 cubic feet (about 78,000 board feet) of growth per acre annually.

Natural range

Redwood has a warm, brownish-red color when sawed from the heart of the tree. Boards with sapwood have contrasting, cream-colored accents. Left unfinished to weather, all redwood turns gray.

Redwood lumber has either flat-grain feature (appearing wavy) or vertical (appearing straight), depending on how it was sawed. Beautifully figured burls produce costly veneer.

Redwood grading contains as many as 45 designations at the mill, but you need only concern yourself with these quality grades:

- *Clear all-heart* contains all heartwood with only minor surface defects on one side.
- *Clear,* the same quality as above, but with sapwood.
- *B-grade,* mixes heart and sapwood, with knots.

Uses in woodworking

Natural chemicals in the heartwood provide redwood with outstanding durability. It resists water, insects, and decay-causing fungi, making it ideal for any outdoor project. Redwood also makes excellent millwork and siding. Because the wood imparts no odor or taste to liquids, it's prime stock for water tanks and other vessels.

Availability

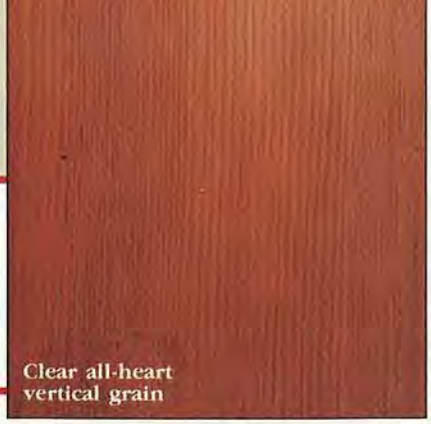
Redwood costs more the farther you live from the tree's home range. In California, for instance, clear all-heart runs about $1.50 per board foot for 1×6" stock, compared to $3.50 in New York. Unlike hardwoods, redwood lumber comes in nominal sizes—1×6, 1×8, 2×4, 4×4, and so on.

Continued

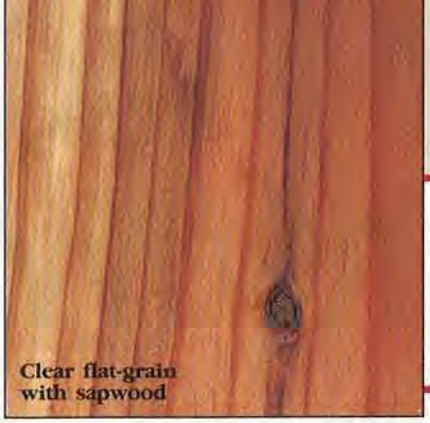
PERFORMANCE PROFILE

redwood

(Sequoia sempervirens)



Clear all-heart vertical grain



Clear flat-grain with sapwood

The availability of redwood in several grades often confuses buyers at the lumberyard. Follow these guidelines when buying for your woodworking projects:

- Construction on or near soil requires redwood grades featuring durable heartwood. Aboveground redwood projects can contain boards with sapwood.
- Architectural grades (Clear all-heart, Clear, and B Grade), sold kiln-dried, provide the finest material for attractive paneling, cabinetry and other interior or exterior project applications.
- Garden grades (Construction heart, Construction common, Merchantable heart, and Merchantable) are usually air-dried, and have tight knots and other defects that only affect appearance. These grades are suitable for decks, porches, fences, gazebos, furniture, and other outdoor, garden-type projects.

Machining methods

Redwood, although considerably light at 23 pounds per cubic foot, has surprising structural strength. And, it remains stable when kiln-dried. However, the straight-grained wood does have a tendency to split and splinter, so take the following precautions:

- Planing requires a shallow cut to avoid chipping and tearout. Joint with a table-height setting that removes no more than 1/16" per pass.
- Ripping redwood poses no special problems, but crosscutting requires a fine-toothed blade to reduce splintering and tearout.
- Avoid tearout in cross-grain routing by using a backing board.
- Redwood joins easily with all types of glues. You will, however, want to drill pilot holes for screws and blunt nails to avoid splitting. And, because the soft wood can tear out in projects subject to stress, such as outdoor furniture, consider adding strength by joining with nuts and bolts.
- You'll find that all types of interior finishes are compatible with redwood. For exterior use, though, avoid clear varnishes and polyurethanes without ultraviolet-light (UV) inhibitors because organic compounds in the wood react with sunlight to break down these finishes rather quickly. Some penetrating finishes—formulated especially for redwood—retard the wood's tendency to turn gray. Other formulations renew the wood's natural color.

Carving comments

- Due to its softness and straight grain, redwood carves effortlessly. Beware of the wood's tendency to splinter, though.
- Redwood will take detail, but it lends itself best to outdoor signs and sculptural forms.

Turning tips

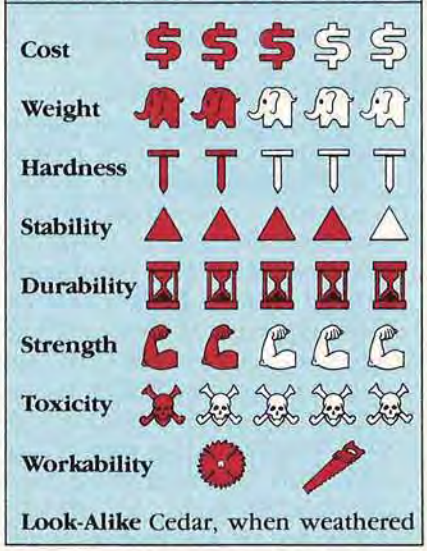
- Keep in mind that sharp tools reduce splinters and tearout.
- Reduce possible tearout in the end grain that appears in the bottom of bowls by sanding the vessel to final shape.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions—and special tips pertaining to this issue's featured wood species—appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade with 24–32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.
- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving softwoods like redwood generally means fairly steep gouge bevels—greater than 20°—and deeper cuts.

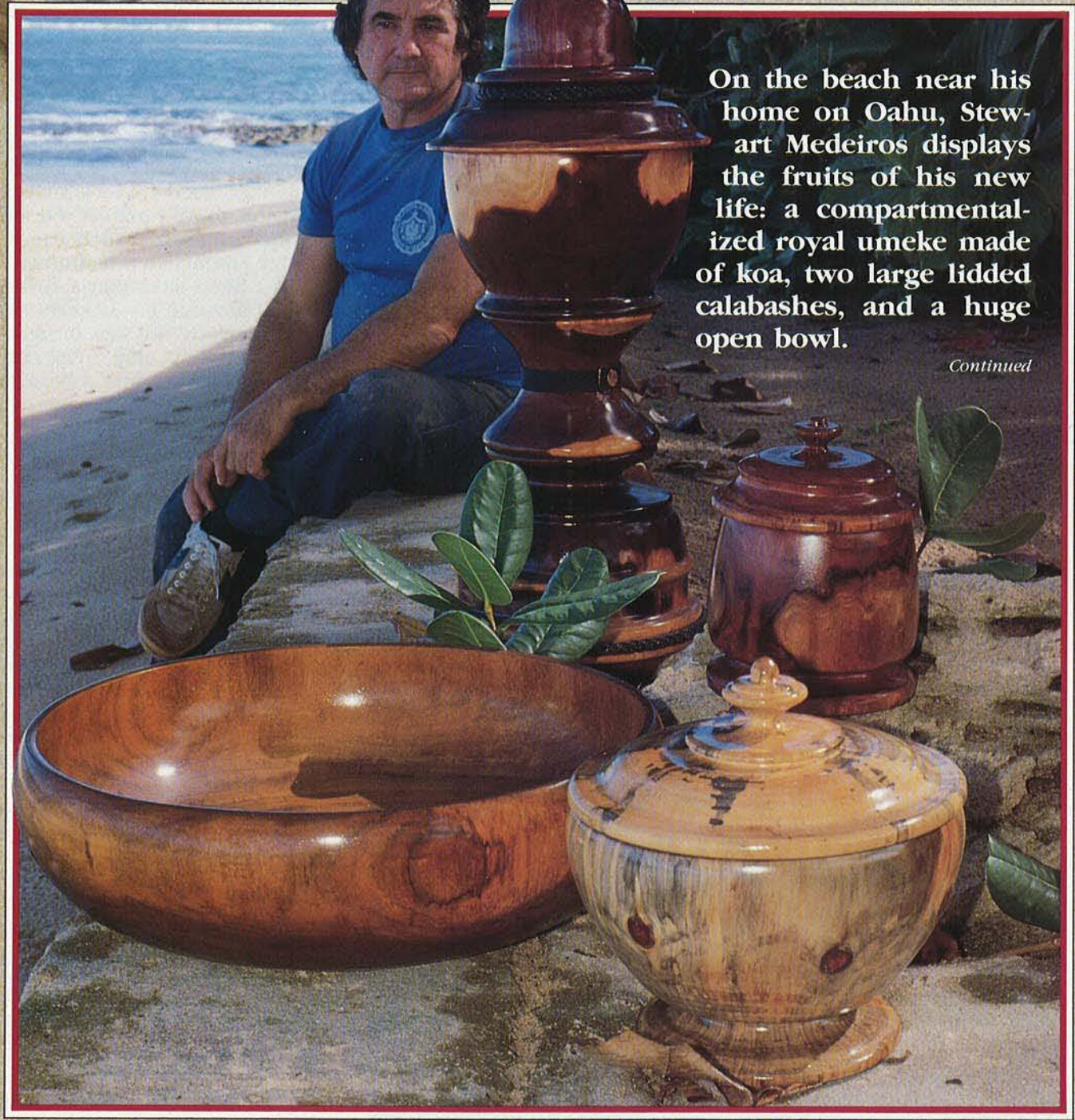
REDWOOD AT A GLANCE



Look-Alike Cedar, when weathered

Photos: California Redwood Assn. Illustration: Steve Schindler Compiled with woodworkers Peter Malokoff, Robert Crevelon, and carver Jack Schultz

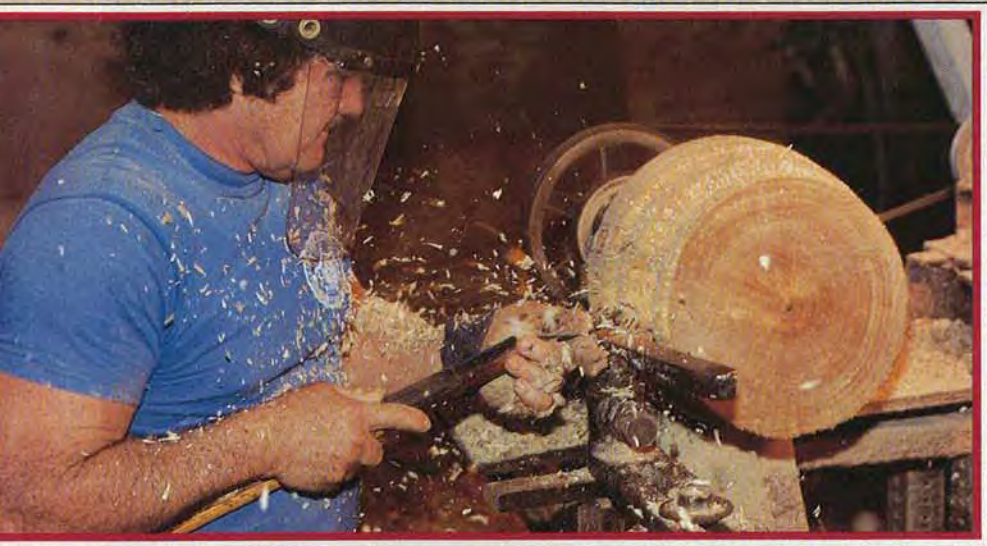
HAWAII'S CALABASH KING



On the beach near his home on Oahu, Stewart Medeiros displays the fruits of his new life: a compartmentalized royal umeke made of koa, two large lidded calabashes, and a huge open bowl.

Continued

Stewart specializes in Hawaiian woods, such as koa, monkeypod, milo, and Norfolk Island pine. Chucked into the headstock here is a piece of green pine that was artificially spalted by keeping it damp. The 22"-diameter chunk may weigh five pounds.



At the lathe, Stewart turns into the end grain. He calls it "log-turning" and prefers the method over slab-turning because with the green wood he likes, he can predict the way the bowl will warp as it dries.

For finish-sanding the inside of his calabashes, the turner has his own invention. Stewart inserts a ¼" shaft with internal threads on one end into a power head. To the threaded end he attaches several 4" squares of sandpaper arranged to overlap. Here he uses the same setup, but with a buffing pad.

Print this article

Reared within view of Honolulu's magnificent Diamond Head, Stewart Medeiros lived a life most boys can only dream about. His Portuguese heritage was lost among native Hawaiian friends as they combed the beach, swam, and surfed—often forsaking the classroom for the ocean. Despite his small frame, he even became his high-school's star running back.

Returning home from a stint with the U.S. Army in the 1950s, Stewart sold women's shoes. Then, seeking to master a trade, he landed a job with a company that produced and sold bowls (called calabashes in The Islands) and other woodenware aimed at a growing tourist market. Stewart applied himself, and became a master production woodturner.

"It's been said that I turned 30,000 bowls in my 30 years with that company," he says matter-of-factly. "I didn't count them, but if there is someone that has turned more calabashes than me, I haven't met him!"

Calabash turning wasn't enough to fill the void when the high-school cheering stopped, however, and Stewart—then smoking three packs of cigarettes daily—filled his off-hours with alcohol and late party nights. Then, six years ago, a stroke struck him down. After a quintuple bypass operation, he set out at age 52 on a new life rededicated to bowl turning, only this time for himself. Since that time, his reputation has grown to that of Hawaii's King of the Calabash.

Stewart rents a modest home at Hauula, on the northeastern side of Oahu—a place to begin again. "There I was after my open-heart surgery with little money,

and devastated because the company didn't call me back to work," he recalls. "So, I took all the negative things in my life and put them behind me. I stopped drinking and smoking. I came here with a positive attitude, and when I did that, I started enjoying myself. All the anger I had built up, I started to put into my work—anger produces energy you know."

Not more than a few blocks from Stewart's house, blue Pacific waves wash the beach. "It's better to be where I am, rather than right on the water," he comments. "The salt wouldn't be good for the finishing of my bowls."

The calabash story

Now, surrounded by the subtropical beauty that is Hawaii, Stewart concentrates on his turnings, and loves to explain the tradition behind them. "The calabash bowls that I make are not what the Westerners found when they came to Hawaii in the early 1800s," he says. "What they saw was a bowl made from a squash or gourd. Then, the calabash began to be made of wood, but not many craftsmen made them, so they were hard to obtain.

"As a result," adds Stewart, "each Hawaiian family that owned a calabash treasured it, and passed it down through the generations as the inheritance of a loved one."

According to the turner, the shape of the calabash eventually evolved into something quite different from the original. "The Westerners brought with them vessels from Europe and the Orient. These had pedestal bases," he explains, "so, the Hawaiians began including them on their calabashes. The same cultural influences brought about the addition of caps and lids on the calabashes, too. And the *ali'i* [royalty], especially Queen Liliuokalani, adored these new calabashes, now called *umekes,* and commissioned them for special occasions.

"But with the passing of Hawaiian royalty," Stewart continues, "umekes ceased to be. Until I started turning my versions, almost 100 years had gone by."

Aloha to the world

When Stewart settled at his oceanside retreat, he harked back to a once-golden philosophy. "Life is a football game—you either watch it from the bench or get in and play," he says. "It doesn't matter if you win or lose, only that you participate."

Following his bypass operation, Stewart's goal was to be good to himself, to make every moment quality time, but he had to get back in the game. "Now, my quest is to touch the world with my work. And, the turnings are my way of giving something back to Hawaii, by reviving its lost art," he says. "You see, when you have goals, more goals start to build."

"... each Hawaiian family that owned a calabash treasured it and passed it down through the generations as the inheritance of a loved one" — *Stewart Medeiros*

In behalf of his quest, Stewart made three tall, elegant calabashes in the umeke style favored by Victorian-era Queen Liliuokalani. One was destined for President George Bush, one to Mikhail Gorbachev as a sign of world peace for the Soviet people, and another to emperor Akihito of Japan.

Gorbachev's umeke—the first of such size and complexity made in Hawaii—was of spalted Norfolk Island pine. Consisting of five calabashes, it stood 5½' tall and was valued at $20,000. The umeke Stewart made for President Bush, although of a different design, featured the same wood. In Gorbachev's, the pine carried signs.

"Inside the umeke that went to Russia were a butterfly, to signify peace, and an eagle with a sickle in its beak to show the United States and Russia working together," says Stewart. "These were natural figures that appeared in the wood."

Understanding island woods

"When I went into the business decades ago, all turners used monkeypod," notes Stewart. "I was the first in The Islands, commercially, to turn bowls of koa."

Because koa cracks as it seasons, it created headaches for turners. But, Stewart learned how to control the problem, though his methods have changed over the years. "Early on, I rough-turned a bowl green, then dipped it in a barrel of highly refined mineral oil each day for about two weeks," he recalls. "When the bowl floated in the oil, it was ready to wipe off and set aside for the months that it took to season." Now, though, Stewart treats koa differently. "When you think about it, trees and people are so much alike," comments the turner

Continued

as he explains his new methodology. "When you cut a tree, for instance, it bleeds and scabs. So, I thought, if I cut the inside of my mouth and my hand at the same time, my hand would take three weeks for the scab to dry, but inside the mouth, it's four days at the longest, because of the continuous moisture. Therefore, you have to heal with moisture."

Today, Stewart keeps the green-turned bowls moist and retards the drying process by covering them with a tarp. "The wood goes through a shock," he adds. "You must give the tree time to adjust."

Most of the koa employed in Stewart's calabashes comes from Oahu, although the wood also grows throughout The Islands. And, he has little trouble keeping supply lines open.

"I either have my wood shipped to me, or it is given," says Stewart. "People call and say they have a tree in their yard, then I go over there to get it. In exchange, I leave them a bowl. And I'm rewarded, because the koa tree is really beautiful—there's black koa, ribbon koa, striped koa, yellow koa, red koa, all different colors."

Other local woods end up as calabashes, too—monkeypod, milo, and, of course, Norfolk Island pine. "The Norfolk pine I use, I spalt myself," Stewart explains of his figured stock. "I leave it in big chunks and spray it with water, then guard it against bugs. The fungus will usually go through the wood right after it's cut, and keep working for the next few months because the sap is still in the wood, drawing it."

Bowls with heft

"I rough-turn all my bowls from green wood," he notes. "But I do what I call log-turning. That's turning into the end grain, and by doing that, I can turn a bowl to

Stewart's "bloodline" umeke, given to the Blood Bank of Hawaii, has six compartments, one for each of his children. Named Marsee, after a daughter, the umeke became a traveling award.

any wall thickness and not worry about warping."

With walls rough-turned to ¾" or 1" thicknesses, then finished to ⅜", Stewart's calabashes have heft—an average one 20" in diameter may weigh five pounds. And he likes them that way. "I don't care for fine, thin turning. I like to feel my bowls, to feel my work," he emphasizes. "I like bowls that have weight, that you can use, that you can eat from."

Although for many years Stewart used the traditional Hawaiian finish for a calabash—kukui nut oil—he now prefers lacquer's deep luster. On each of his vessels, he sprays 10–15 coats of semigloss over a sealer. "Then, they shine like glass," he says.

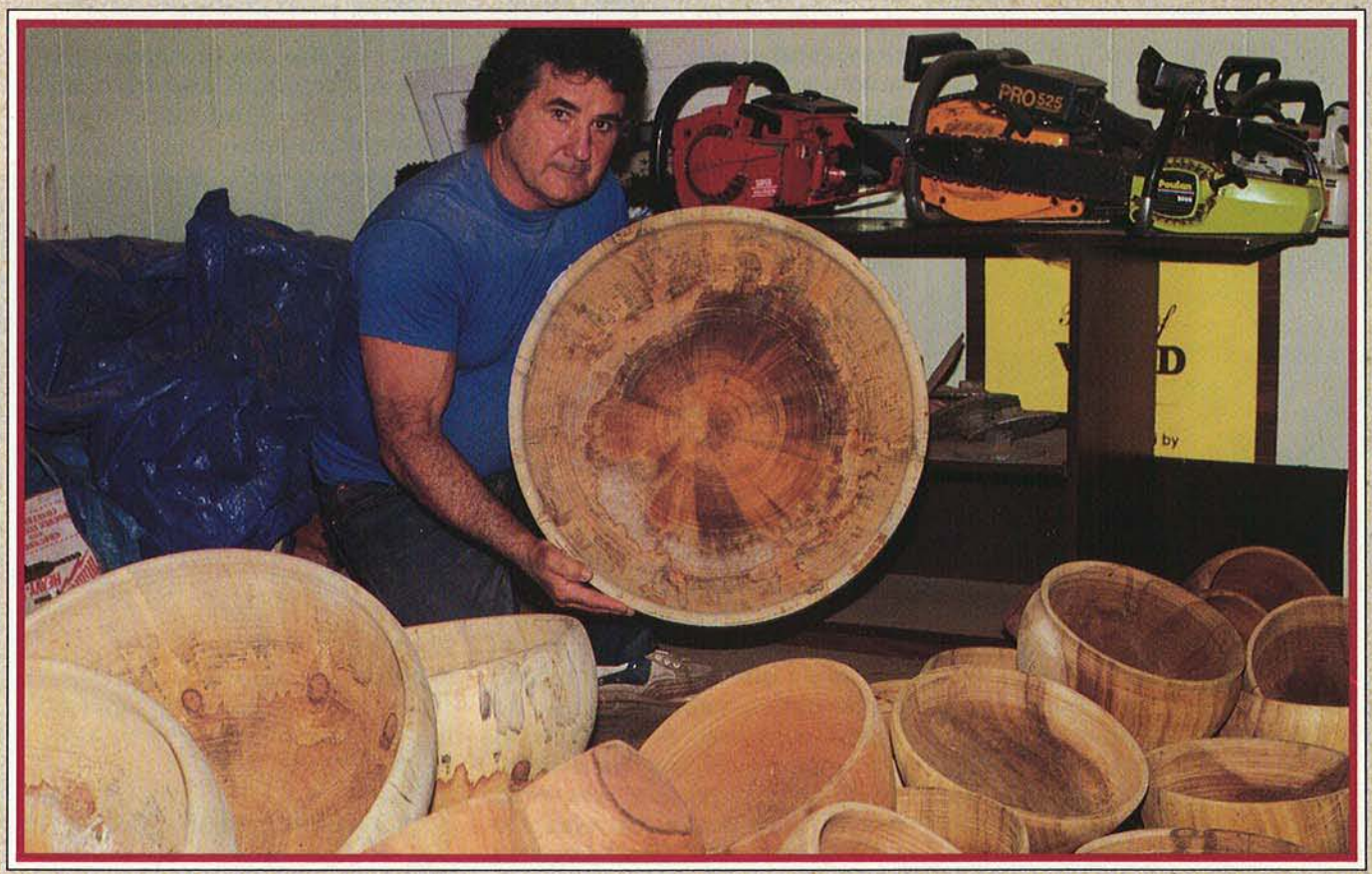
How much cash for a calabash?

Stewart only sells his calabashes wholesale, letting word of mouth do his advertising. At $75 for a modest-sized bowl, to the occasional $35,000 royal umeke, the born-again turner keeps as busy as he wants to.

"I decide how much I can turn by my supply of wood, because I work it green," Stewart says. "It is important that I work on all my cuttings, then put them aside to dry. Then, I work on those to be sanded. But I don't work for production. I don't count the time or the number of calabashes I make.

"I give myself a lot of time, I listen to my body now," he continues. "But I won't go back and ask the doctor if it's okay to turn, and he says no. I'd rather die this way. You can't make beautiful things if your attitude is bad."

Written by Peter J. Stephano
Photographs: Bob Hawks



Awaiting finish-turning, Stewart's pile of seasoned, rough-turned bowls include all sizes. "Because I work the wood green, I try to do all the rough-turning at one time," he says, "then, when they season, all the finishing.

INTARSIA THE Judy Gale Roberts WAY

STEP-BY-STEP INSTRUCTIONS AND TWO FANTASTIC PATTERNS TO GET YOU GOING

Print this article

Things haven't been the same for Judy Gale Roberts since we featured her on the cover of the August 1988 issue of *WOOD*® magazine. The increased demand for her patterns has left her and partner Jerry Booher with little time to leave their Lufkin, Texas, studio, which is just fine by them. "We don't miss the art-show grind at all," Judy told us when we recently paid another visit.

This time, we commissioned Judy to create two original project designs shown *opposite page, top* just for *WOOD* magazine readers. And, are we pleased with the results! While in Judy's shop, we followed her through the intarsia process for the cat design, and we'll share with you what we discovered. You'll find an enlargeable pattern for that design on *pages* 32 and 33. Or, if you would like to order full-sized patterns for the cat and the parrot, see *page* 32 for a special offer.

1 Select the right stock. For her "palette" of wood shades, Judy works almost exclusively with ¾"-thick western red cedar for light to dark woods, and pine when she needs a nearly white wood. She prefers these two softwoods because they sand easily, don't weigh much, and cost less than native hardwoods. "I go to the lumberyards and handpick boards that have lots of color variation and wild grain patterns," Judy told us. For framed projects, such as the cat, she planes the stock for the background to ⅜". You also could resaw and sand this stock to the needed thickness.

2 Transfer pattern parts with a fine-tip ballpoint pen and carbon paper. "To keep things straight, I trace all the dark parts first, then I move on to the medium, light, and white parts," Judy told us. After finding the area of your stock with the best color and the correct grain direction for each part, place carbon paper beneath the pattern and hold both sheets in place with pushpins. For a tight-fitting intarsia project, *you must be careful to accurately trace the pattern lines. And, don't forget to include the piece numbers marked on the patterns.*

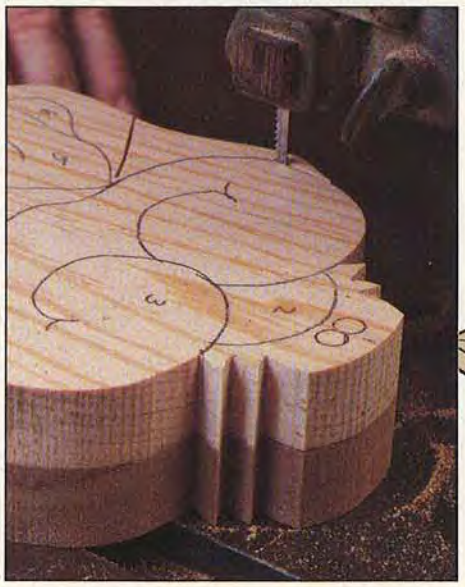
Before completely removing the pattern, pull out a few of the pins (leaving at least two pins in place) and peel back the pattern as shown *below.* Check to see if all the pattern's lines transferred onto the wood. If not, lay the pattern and carbon paper back down on the wood, reinsert the pins you removed, and trace any missed lines. Now, remove the pins and pattern.

To check the completeness of your tracing, remove all but two of the pushpins and peel back the pattern.

3 Carefully cut each part. Jerry does most of the cutting for Judy, using either a ¼" or ⅛" bandsaw blade or a No. 6

We asked Judy Gale to come up with two winning designs for *WOOD* magazine readers, and did she deliver! We'll show you how to make the framed-cat piece *above.* On page 32 you'll find a special full-sized pattern offer for the cat and the parrot *(right).*

scrollsaw blade. "You can't rush this step," Jerry told us. "For minimal gaps between the pieces, I carefully cut right down the middle of the line." After cutting each piece, mark its number on the back surface.

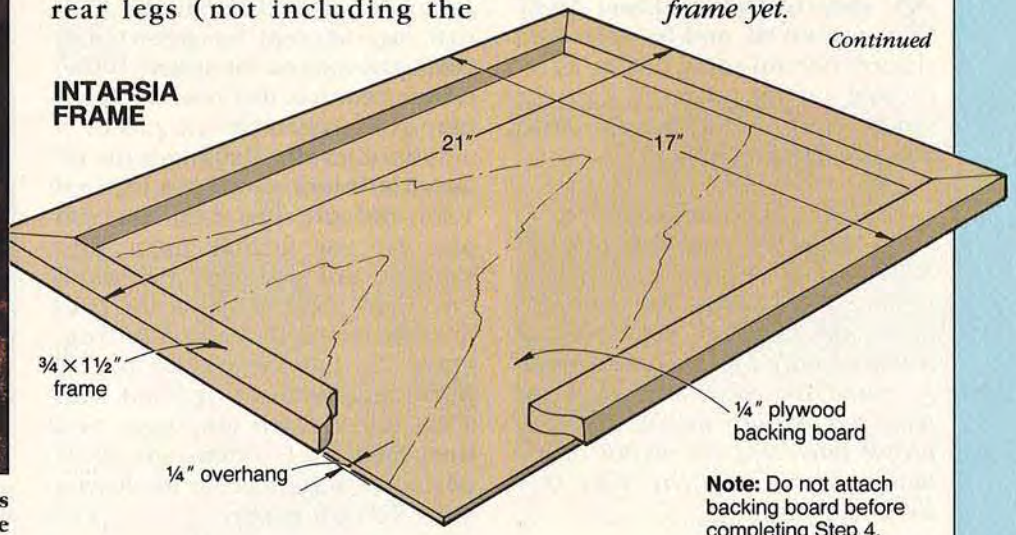


By sandwiching dark and light woods together, you can save time and reduce gaps between pieces.

For patterns that have alternating dark and light pieces, such as the stripes in the cat's body, Jerry offered this time-saver: Sandwich together pieces of dark and light wood with double-faced tape, and then cut the pieces as shown at *left.* For the cat, you can cut the head and front legs in one sandwich, as well as these sections: the main body above the branch, the rear legs (not including the paws), and both tail assemblies. Although this process wastes half of the stock, you gain increased efficiency and accurate-fitting parts that makes this step more than worth it.

If the design requires a frame, cut and assemble it at this point. Judy keeps her frames simple, as shown *opposite. Do not attach the ¼" plywood backing board to the frame yet.*

Continued



INTARSIA

4 Assemble the parts. Thanks to the numbers you marked on the pieces earlier, your project should come together like a big jigsaw puzzle. Check the pieces for fit within the frame. Gaps up to 1/16" usually look okay, except around the smallest pieces.

For our cat, and other projects that have pieces jutting into the frame, place the pieces on the top face of the frame in their designated locations, and trace around them with a pencil as shown *below.* Cut along these lines with your bandsaw or scrollsaw. Now, attach the ¼" plywood backing board to the frame.

Trace around any parts that extend into the frame, then cut along this line.

Place ⅛" and ¼" spacers behind any areas that need to be raised.

5 Add the spacers. For added depth and realism, Judy places ⅛" and ¼" plywood spacers behind some pieces, as indicated on the patterns. Cut the spacers just slightly smaller than the area they fit into.

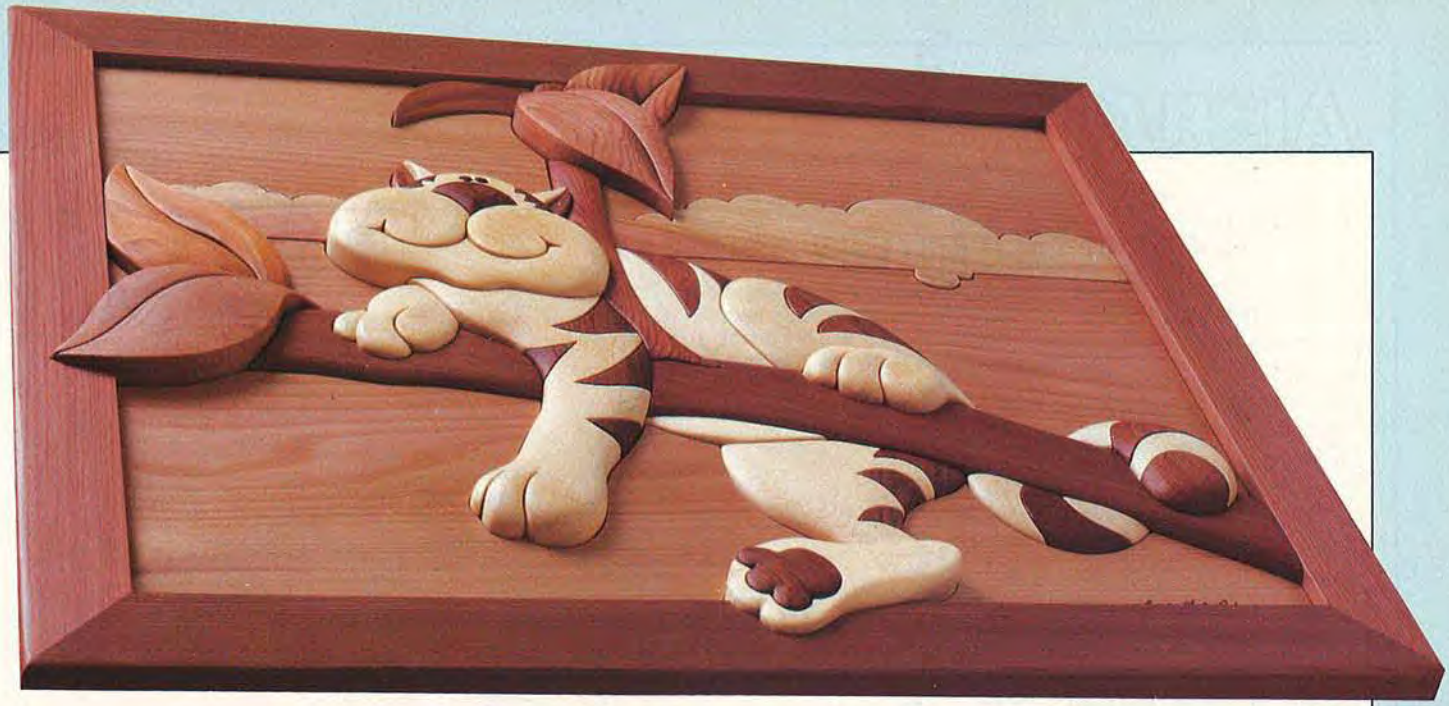
6 Shaping comes next. ***Note:*** *For best results, practice your shaping on scrap pieces. If you don't feel comfortable with this step, simply do as many of Judy's followers do: gently round the edges and leave the faces flat. As Judy told us: "A lot of people have sent me photos of my designs done this way, and they look just fine."*

Start this part of the project by marking the height of the background surface on the edges of the raised sections (cat, tree limb, and leaves, as shown at *right.*) These marks tell you how far you can round the pieces. Judy marks and shapes the parts with the least depth first, and then does the same to those with progressively greater depths.

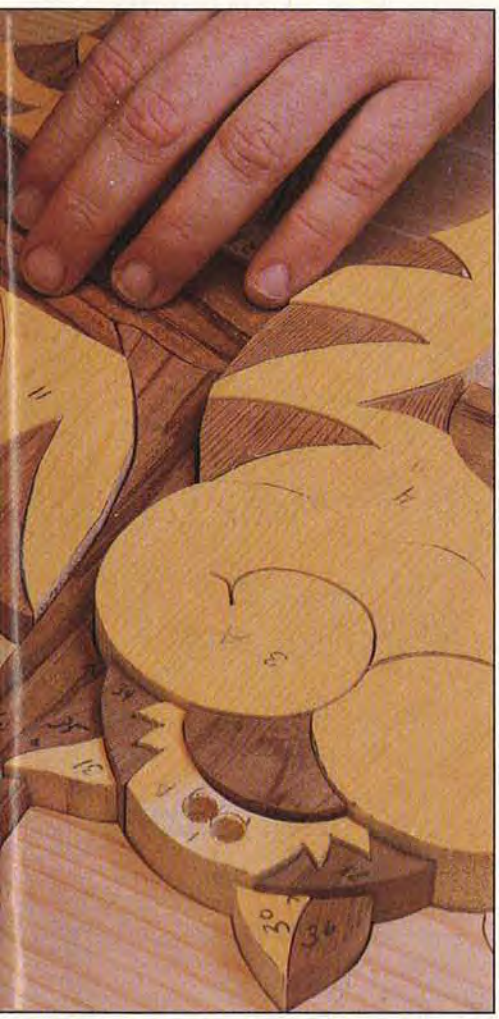
When possible, double-face-tape several pieces to a ¼"-thick backing board so you can sand them as a single assembly. For example, we attached the pieces of the cat leg to the underlying spacer and then sanded this assembly. Judy also sanded the body, both rear legs (except for paws), and both tail pieces as units. When done, remove the double-faced tape and reassemble the pieces.

Judy does the shaping with inflatable drum sanders outfitted with 100-grit abrasives, but you also can use flexible discs, strip sanders, and stationary belt sanders. Tight areas, such as the cat's mouth, require hand-sanding. Once she has the pieces shaped, Judy smooths them by hand with 150- and 220-grit abrasives. As a final touch, she softens any sharp edges, such as those on the leaves, with 220-grit paper.

Before shaping any parts, mark the height of adjoining lower pieces.



To get an idea of how to shape the pieces, carefully study this low-angle view of our cat on a branch. With the exception of the ⅜"-thick background, all of the pieces are rounded to some extent.

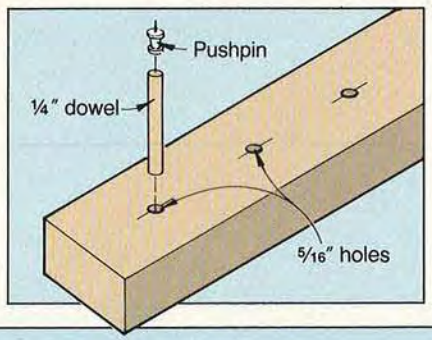


7 Apply a matte finish to all but the back surfaces. Cedar soaks up a lot of finish, so Jerry first applies three coats of Bartley wiping-gel varnish. He and Judy prefer a satin finish, so he sprays on a final coat of Krylon No. 1311 aerosol matte finish.

To simplify the spraying, epoxy a pushpin to one end of several 4"-long dowels as shown *below*. Insert these mini spears into a 2×4 and stick the backsides of the workpieces to the pushpins. With the pieces held aloft this way, you can coat them in one spraying with little mess.

8 For frameless projects, such as the parrot, cut your backing board at this time. Nonframed projects require a backing board of ¼" lauan plywood that precisely follows the outline of the pattern. To make the backing board, first spray one side of a sheet of white paper (just larger than the project) with self-adhesive spray. *After the spray dries,* apply the paper to the plywood and arrange the pieces on the paper. Then, trace the outline of the pattern onto the paper as shown *below*. Judy prefers a mechanical pencil because it stays sharp and helps her avoid moving the pieces as she marks.

Remove the pieces and cut just inside the line with a jigsaw. Peel away the white paper and disguise the edges of the backing board with dark brown stain.



9 Attach the pieces to the backing board. After dry-assembling all the project's

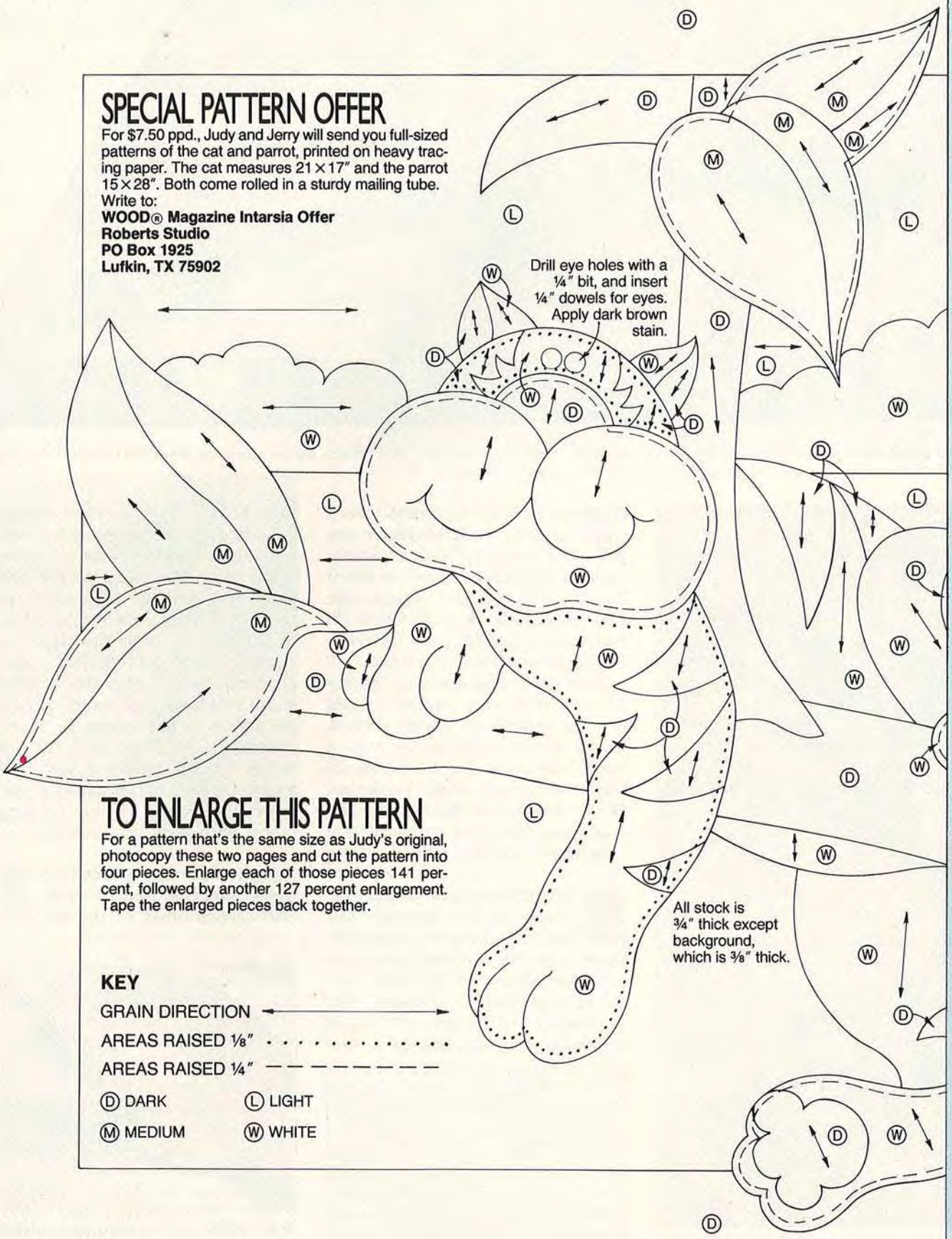
▲ Be careful not to move the intarsia pieces when outlining the shape of projects without frames.

Continued

SPECIAL PATTERN OFFER

For $7.50 ppd., Judy and Jerry will send you full-sized patterns of the cat and parrot, printed on heavy tracing paper. The cat measures 21×17″ and the parrot 15×28″. Both come rolled in a sturdy mailing tube. Write to:

WOOD® Magazine Intarsia Offer
Roberts Studio
PO Box 1925
Lufkin, TX 75902


Drill eye holes with a ¼″ bit, and insert ¼″ dowels for eyes. Apply dark brown stain.
All stock is ¾″ thick except background, which is ⅜″ thick.

TO ENLARGE THIS PATTERN

For a pattern that's the same size as Judy's original, photocopy these two pages and cut the pattern into four pieces. Enlarge each of those pieces 141 percent, followed by another 127 percent enlargement. Tape the enlarged pieces back together.

KEY

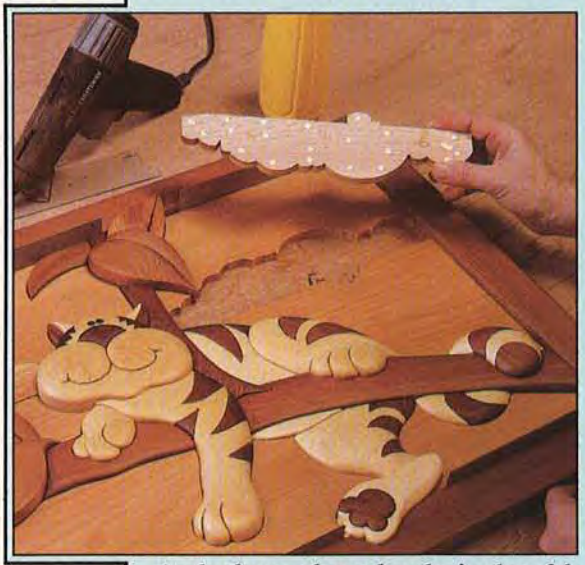
GRAIN DIRECTION ←——→
AREAS RAISED ⅛″ . . . . . .
AREAS RAISED ¼″ — — — — — —

Ⓓ DARK Ⓛ LIGHT
Ⓜ MEDIUM Ⓦ WHITE

pieces, glue them down one by one as shown *below*. Start with the background, and work toward the higher areas. Space drops of woodworker's glue every inch or so onto the back of the pieces. To hold the larger pieces in place as this glue dries, apply two or three drops of hotmelt glue.

As you can see in the photo, Judy uses cardboard spacers made from the back of note pads to help her evenly space the background pieces from the frame. (You may not need these spacers, but they come in handy if your pieces don't fit perfectly.)

After completing your masterpiece, don't forget to sign it—you deserve the recognition!



Apply drops of woodworker's glue, followed by a few dabs of hotmelt glue, before fastening pieces.

Buying guide

• Bartley wiping-gel varnish. One 8 oz. jar, $5.95 ppd. from The Bartley Collection. To order, call 800-227-8539.

Want to know more?

For a free newsletter filled with intarsia tips, and pattern and video offers, just send a stamped, self-addressed, business-size envelope to Roberts Studio at the address *opposite page, top left.*

Written by Bill Krier
Photographs: Bob Hawks
Illustrations: Bill Zaun

ITS TIME HAS COME
READY-REFERENCE

Print this article

We liked this digital calendar/clock so much that we built an attractive oak stand to go with it. And, the alarm feature makes this project suitable for the bedroom, office, or any other room where busy people plan their day.

Cut the pieces, and form the groove

1 Cut the 3×3¾" base piece to size from ¾"-thick stock. Sand it smooth. From the same ¾" stock, cut a piece 4×12" for the slanted back. (For safe machining, we began with an extra-long piece.)

2 Referring to the three-step drawing shown at *right*, cut a groove down the center, and then bevel-rip both edges of the back.

3 Sand the back smooth. (We wrapped sandpaper around a scrap block to sand the grooved area.) Sand a slight round-over along the top, pointed edge of the back where shown on the Exploded View drawing.

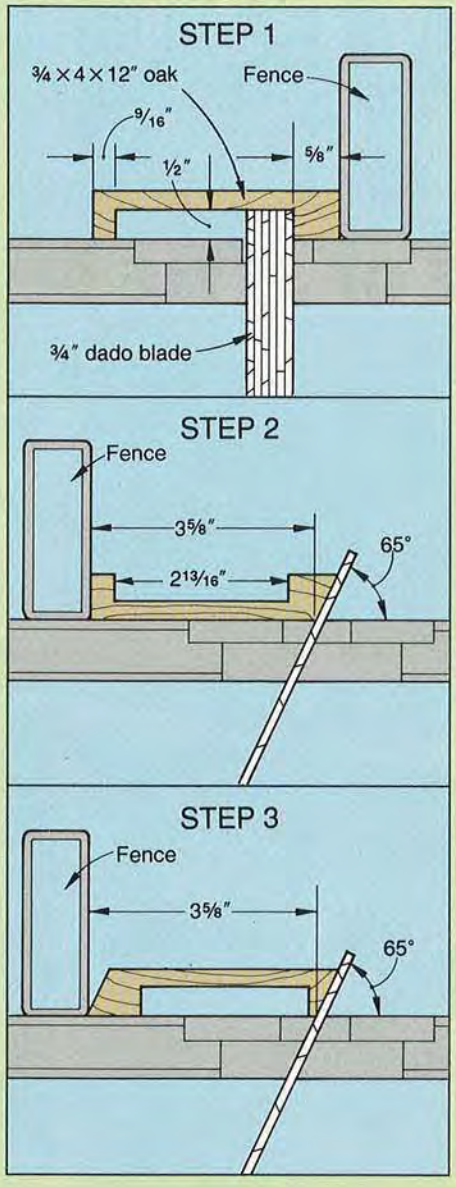
4 As shown at *right*, glue and clamp the grooved back piece to the base 1¼" from the base's front edge. To prevent denting the back piece, use a clamp with plastic pads on the heads or use softwood clamp blocks.

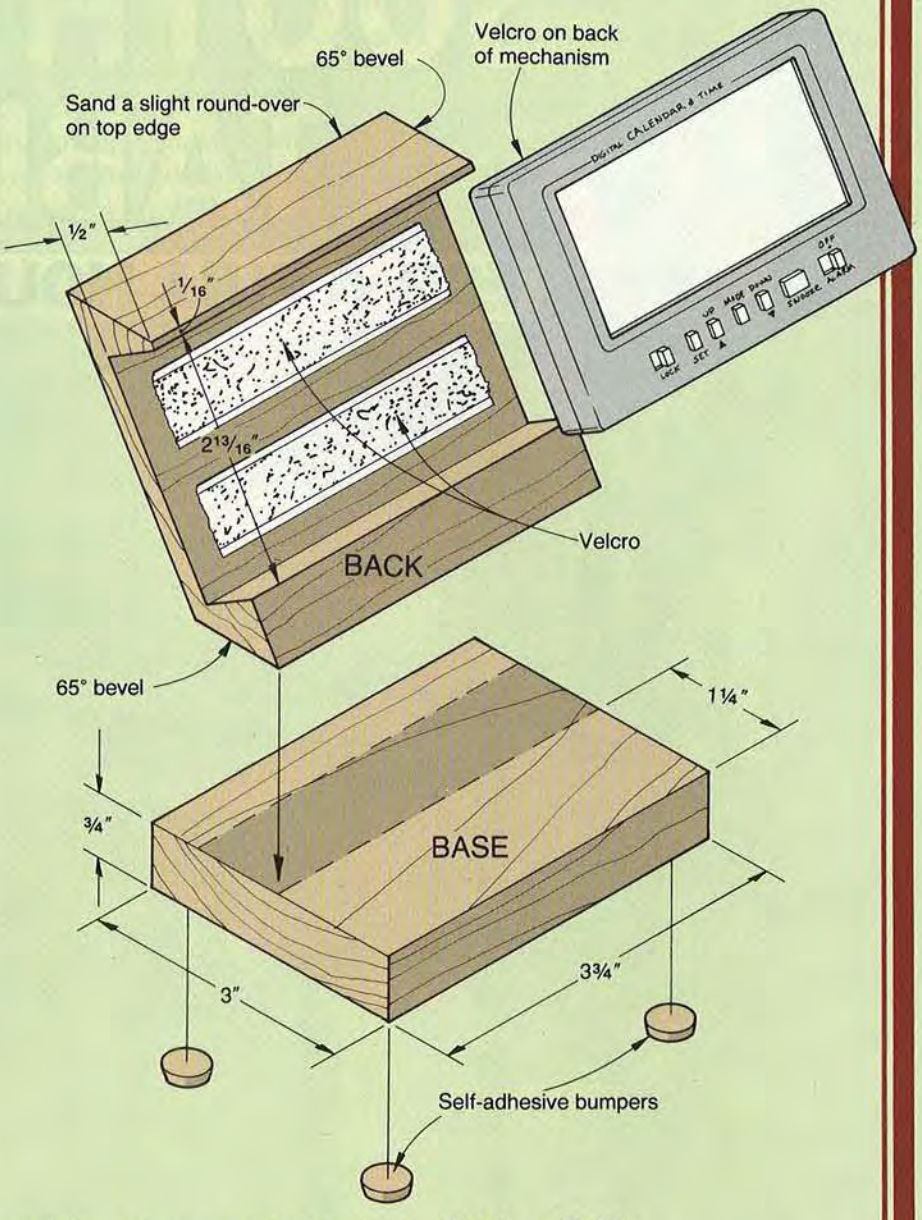
5 Finish-sand the holder and apply the finish.

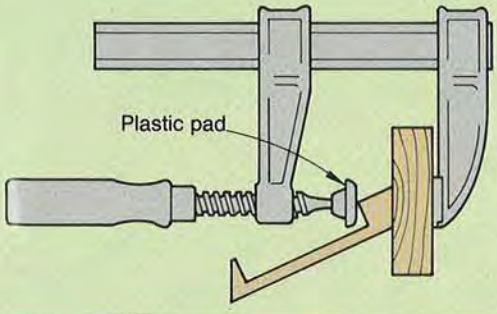
Add the mechanism and feet

1 Cut the Velcro supplied with the calendar into four 3"-long pieces. Peel off the backing, and stick two of the Velcro pieces to the back of the calendar, being careful not to cover the battery cover. For better adhesion between the Velcro and wood, use steel wool to rub the dadoed area of the back piece. Adhere the two

CALENDAR/CLOCK







remaining pieces to the dadoed area where shown *above*.

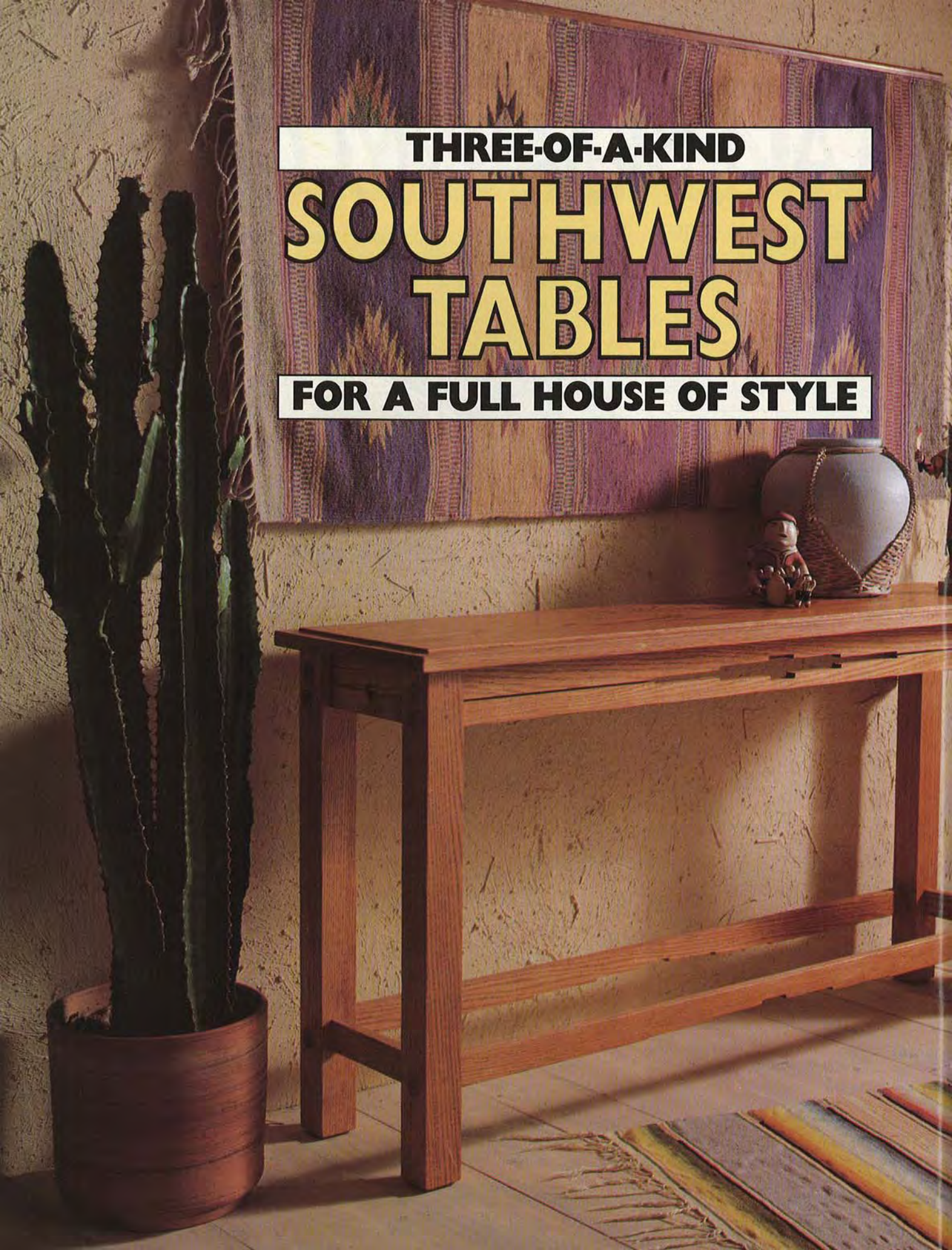
2 Finally, apply four self-sticking bumpers or felt pads (like those used on cabinet door backs) to the bottom of the base.

3 Using the instructions supplied with the calendar, set the functions, and position the calendar in the dadoed recess.

Buying Guide

• **Digital calendar.** Mechanism, battery, and 6" of Velcro, $19.95 (U.S.) ppd. Classic Gifts Int., 2501 S.E. Reedway, Portland, OR 97202 or call 800-933-2093 or 503/232-0063 to order.

Photograph: John Hetherington
Illustrations: Jamie Downing; Mike Henry


THREE-OF-A-KIND
SOUTHWEST
TABLES
FOR A FULL HOUSE OF STYLE

Print this article

You don't have to live in the great Southwest to justify building one or more of these distinctive matching tables. They'll look terrific in any number of room settings from Maine to Hawaii.

Aside from their individual dimensions, our sofa, end, and coffee tables share identical sturdy construction, while featuring unique design elements. These include through mortise-and-tenon joinery, and the stepped and diamond patterns found in the rails.

The directions starting on this page are for the sofa table, above left. To build the other two tables, refer to the Bill of Materials and the Exploded-View drawings on page 39.

Start with the legs

1 For the sofa table legs (A), cut 12 pieces of ¾" stock to 2¼ × 27".

2 Separate the pieces into groups of three for each of the four legs. With a pencil, mark a 1 on one piece, a 2 on another, and a 3 on the third for each leg.

3 On the four pieces marked 1 (outside pieces), mark the three centerpoints on each piece for the ¼" dowel holes (see the Leg drawing for location).

4 On the parts marked 2 (the center pieces), locate and cut 1" dadoes ½" deep. (We cut the dadoes on the tablesaw and fitted our miter gauge with a long auxiliary fence for additional support. We used a stop to ensure equal dado placement from leg to leg.)

5 Lastly, mark the location of the three mortises on each piece marked 3 (inside pieces). Form the mortises, using the Mortise detail for reference. You also could drill blade-start holes and cut the mortises to size with a scrollsaw.

6 *With the edges and ends flush,* and using the Leg drawing for reference, glue and clamp the four groups of three pieces (1, 2, and 3) face-to-face to make four legs.

7 Scrape the excess glue from the edges of each leg and sand smooth. Cut a ¼" rabbet ¼" deep around the bottom of each leg. (We did this on a tablesaw fitted with a dado blade. We attached a wooden auxiliary fence to our miter gauge and clamped a stop to the fence to ensure the same-sized rabbets on all four legs.) *Continued*

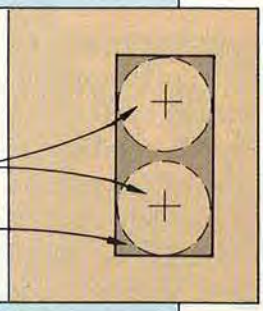
SOUTHWEST TABLES

MORTISE DETAIL

STEP 1. Layout mortise locations

STEP 2. Drill two ½" holes inside mortise

STEP 3. Chisel mortise square.

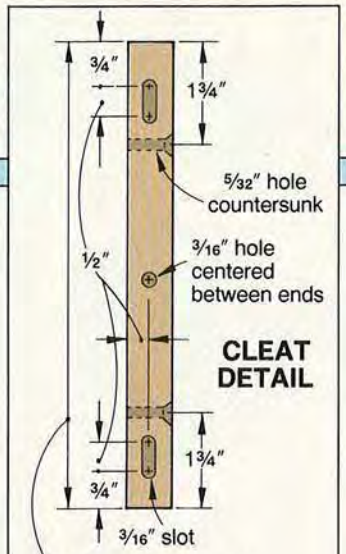


Bill of Materials

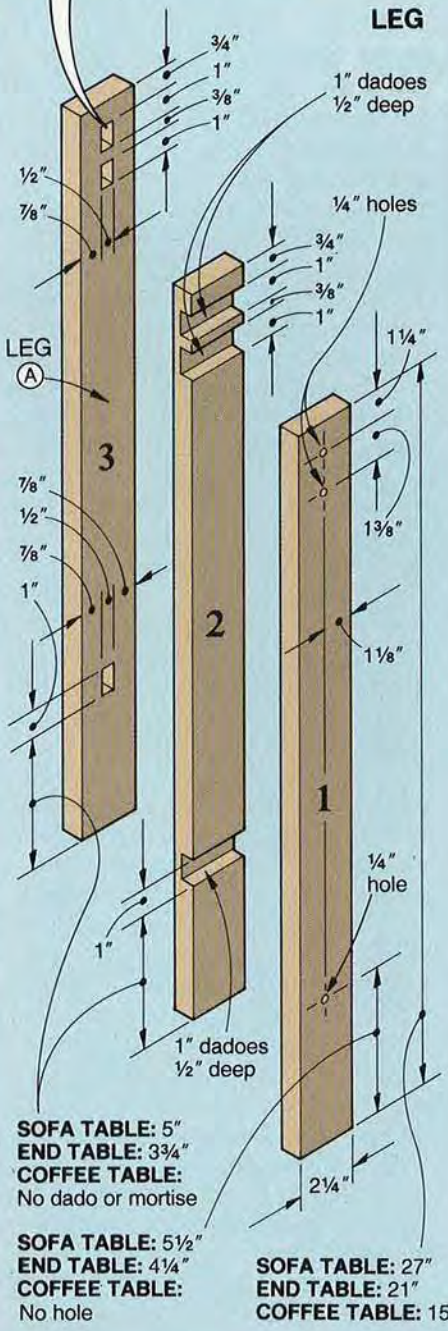
Part		Finished Size T	W	L	Matl.	Qty.
SOFA TABLE						
A	legs	2¼"	2¼"	27"	LO	4
B	btm front aprons	¾"	1¼"	51½"	O	2
C	apron/ stretcher	¾"	1¾"	51½"	O	4
D	btm side aprons	¾"	1¼"	8⅞"	O	2
E	top side aprons	¾"	1¾"	8⅞"	O	2
F	lwr side stretcher	¾"	1¾"	8⅞"	O	2
G	top	1 1/16"	14"	53"	EJO	1
H	cleats	¾"	1"	7½"	O	2

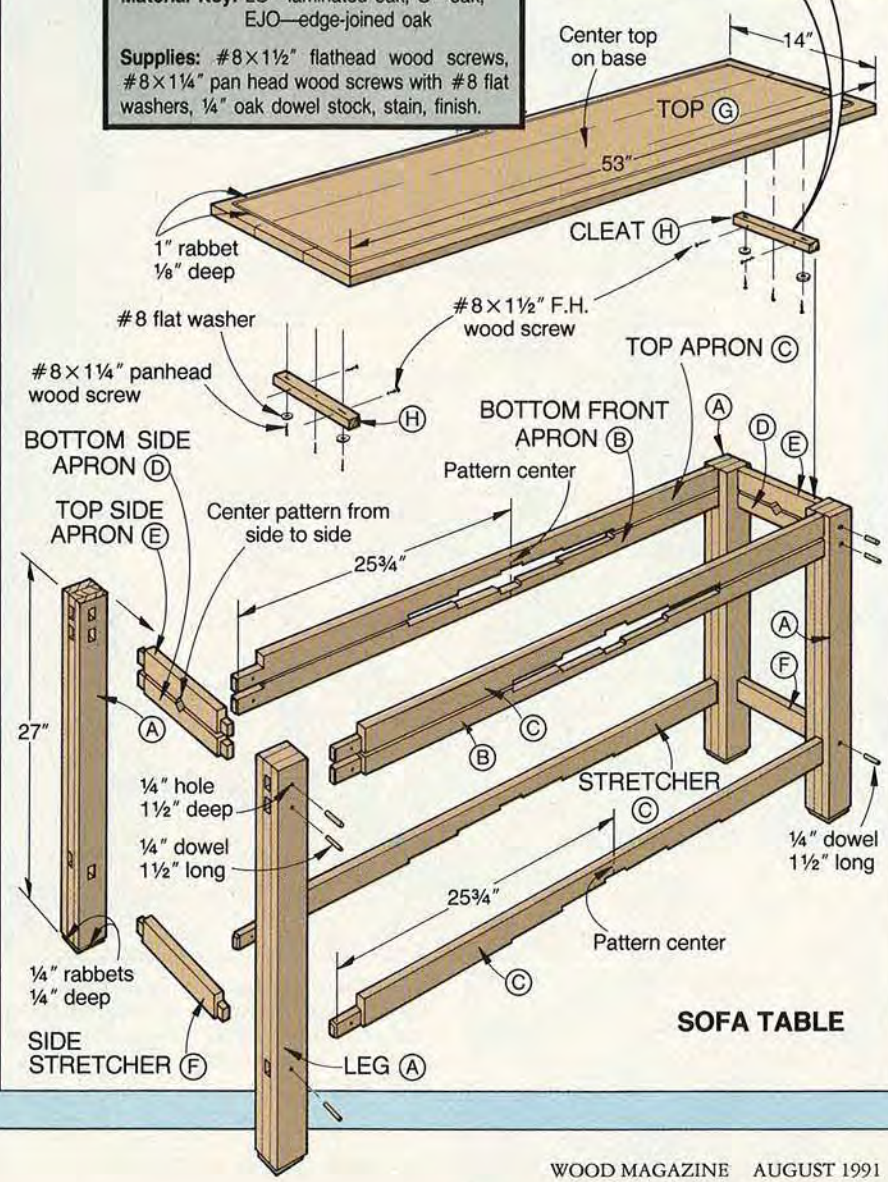
Material Key: LO—laminated oak, O—oak, EJO—edge-joined oak

Supplies: #8×1½" flathead wood screws, #8×1¼" pan head wood screws with #8 flat washers, ¼" oak dowel stock, stain, finish.

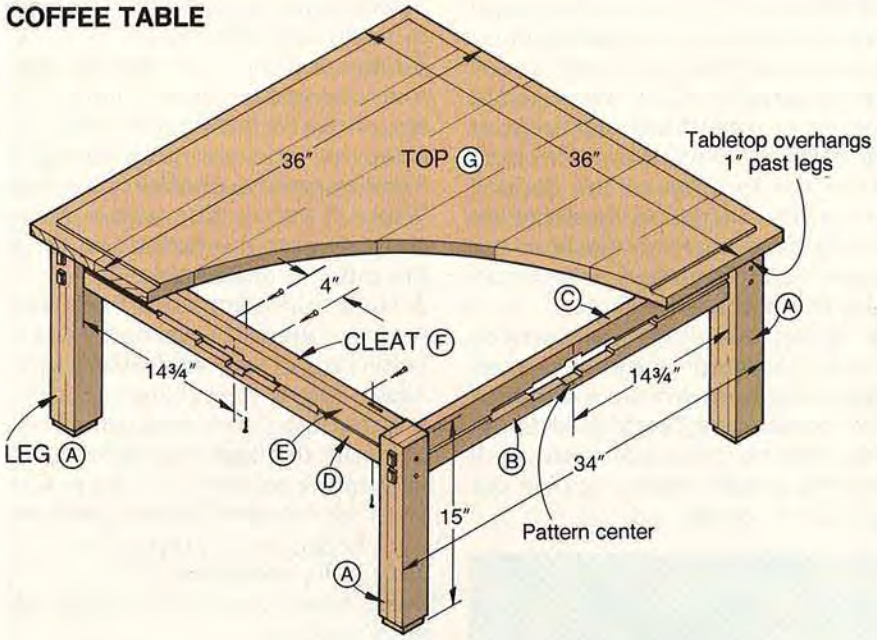


LEG





COFFEE TABLE



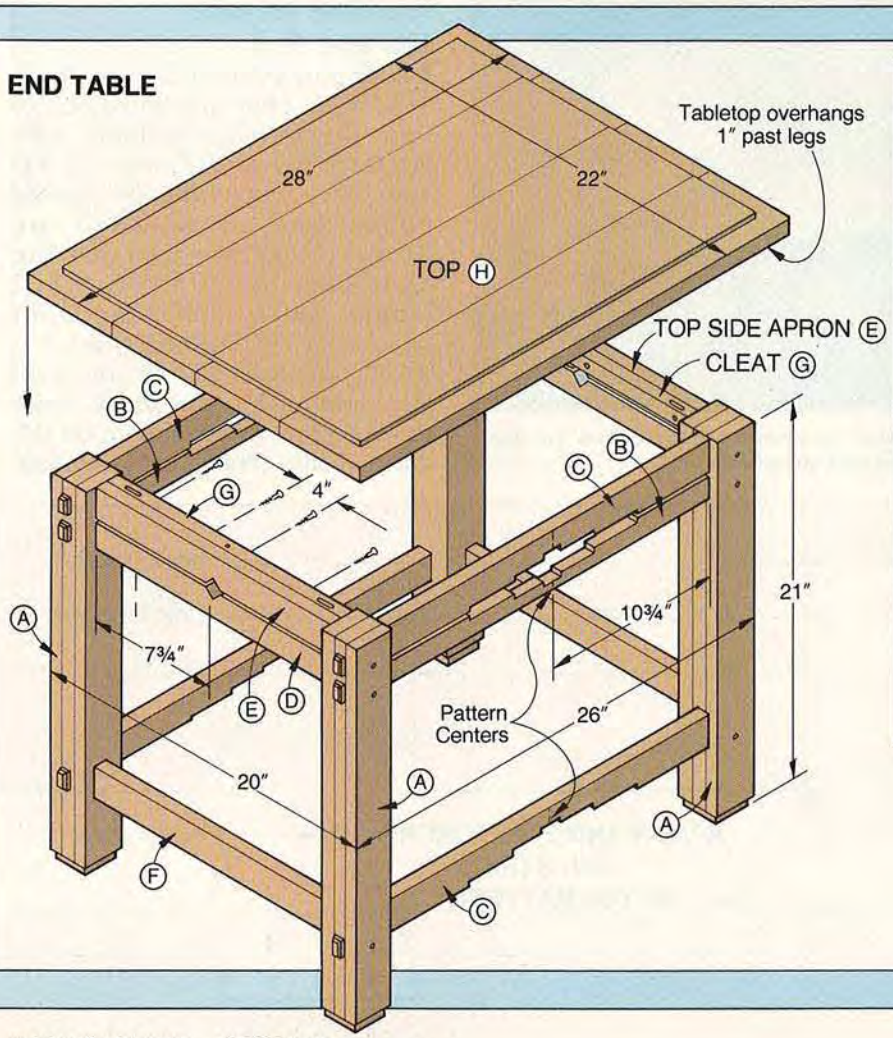
Bill of Materials

Part		Finished Size T	W	L	Matl.	Qty.
COFFEE TABLE						
A	legs	2¼"	2¼"	15"	LO	4
B	btm front aprons	¾"	1¼"	34½"	O	2
C	top front aprons	¾"	1¾"	34½"	O	2
D	btm side aprons	¾"	1¼"	30⅞"	O	2
E	top side aprons	¾"	1¾"	30⅞"	O	2
F	cleats	¾"	1"	29½"	O	2
G	top	1 1/16"	36"	36"	EJO	1

Material Key: LO—laminated oak, O—oak, EJO—edge-joined oak

Supplies: #8×1½" flathead wood screws, #8×1¼" pan head wood screws with #8 flat washers, ¼" oak dowel stock, stain, finish.

END TABLE



Bill of Materials

Part		Finished Size T	W	L	Matl.	Qty.
END TABLE						
A	legs	2¼"	2¼"	21"	LO	4
B	btm front aprons	¾"	1¼"	26½"	O	2
C	top front aprons	¾"	1¾"	26½"	O	4
D	btm side aprons	¾"	1¼"	16⅞"	O	2
E	top side aprons	¾"	1¾"	16⅞"	O	2
F	lwr side stretcher	¾"	1¾"	16⅞"	O	2
G	cleats	¾"	1"	15½"	O	2
H	top	1 1/16"	22"	28"	EJO	1

Material Key: LO—laminated oak, O—oak, EJO—edge-joined oak

Supplies: #8×1½" flathead wood screws, #8×1¼" pan head wood screws with #8 flat washers, ¼" oak dowel stock, stain, finish.

Continued

SOUTHWEST TABLES

Cut and shape the aprons and stretchers

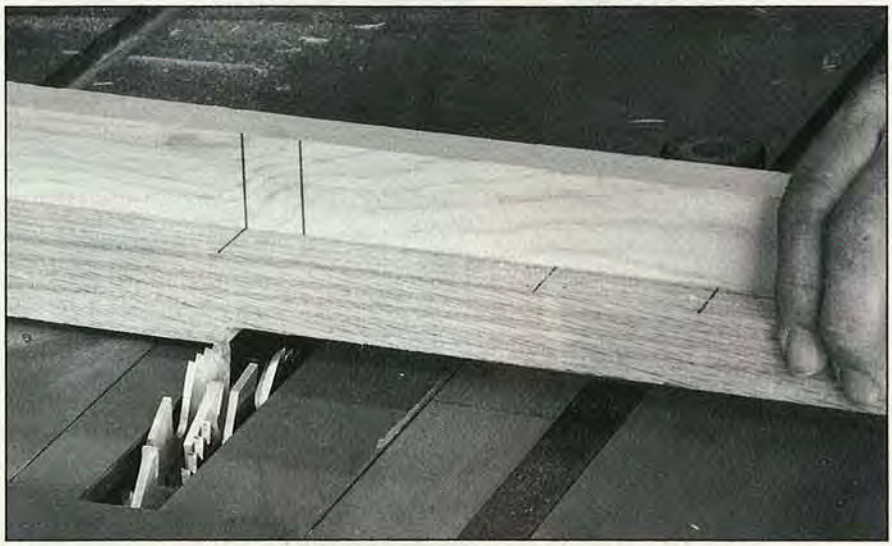
1 Cut the front and side aprons and stretchers (B, C, D, E, F) to the sizes listed in the Bill of Materials.

2 Cut two-shouldered tenons on the ends of each apron and stretcher, using the Tenon detail on the *opposite page* for sizes.

3 Using the Patterns drawing *below* for dimensions, mark the layout of the stair-step notches and half-diamond on the apron and stretcher pieces. With a bandsaw, scrollsaw, or handsaw, cut the half-diamonds to shape in apron parts D and E.

4 Cut the stair-step notches to shape in parts B and C. (As shown in the photo *below*, we fitted our tablesaw with a dado blade, and then cut a notch through the auxiliary wood fence attached to our miter gauge. Next, we used a square to mark lines on the front face of the auxiliary fence to show the location of the dadoed notch. The marks on the fence allowed us to correctly position the aprons and stretchers when cutting the notches to shape.)

5 Wrap 100-grit sandpaper around a scrap block, and sand the dadoed notches smooth. Now, use the sanding block to sand ⅛" chamfers on the ends of the protruding tenons where shown on the Tenon detail.



Mark the edges of the dado cut in your auxiliary fence and use these lines for alignment when cutting the pattern in the aprons and stretchers.

Now, assemble the base

1 Dry-fit the aprons and stretchers between the legs to check the fit; trim, if necessary.

2 Glue and clamp a top and bottom side apron (D, E) and a side stretcher (F) between two legs to form one end assembly. Using a framing square, check for square. Wipe off excess glue with a damp cloth. Repeat the process to form the other end assembly.

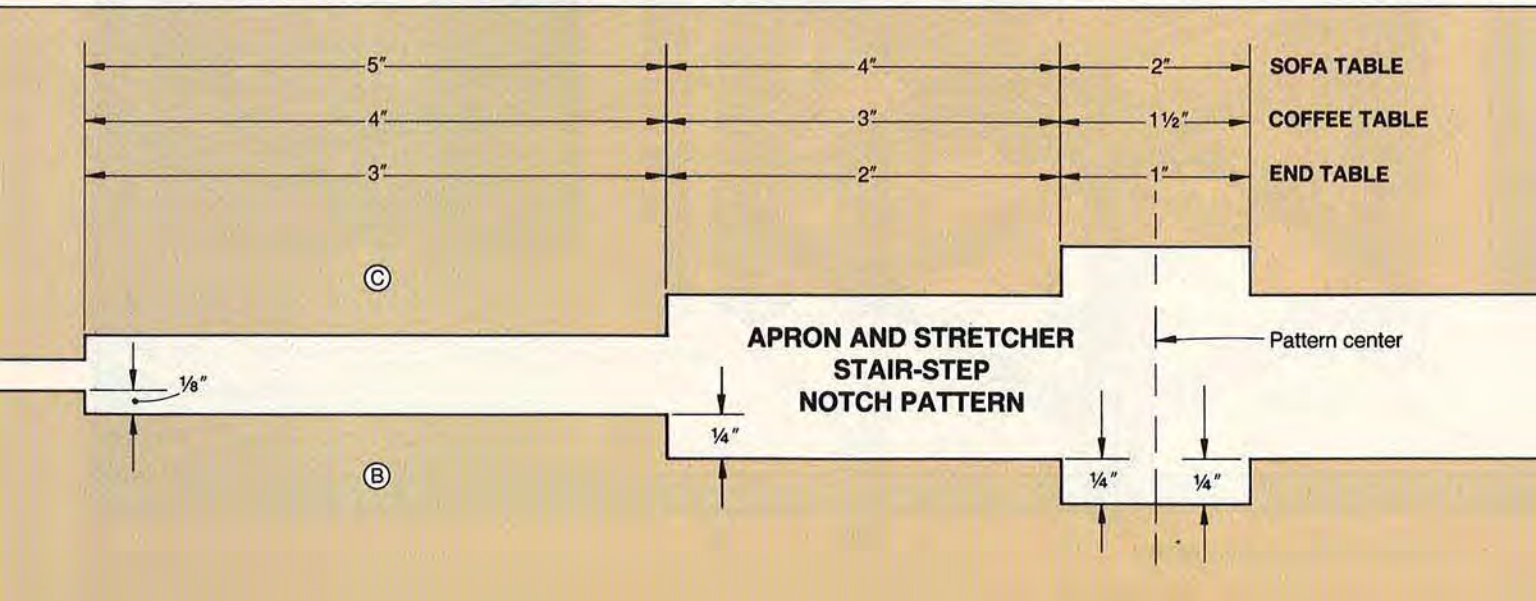
3 Glue and clamp the front and back aprons and stretchers (B, C) between the two end assemblies. Again, check for square.

4 Using the previously drilled ¼" holes in the legs as guides, drill ¼" holes a total of 1½" deep. Cut eight pieces of ¼" dowel stock to 1⅝" long. Put a drop of glue in each hole, and drive the dowel in place. Later, trim the dowels flush with each leg.

It's time for the top and finish

1 Edge-join three or four pieces of 1⅛"-thick (five-quarter) stock to form the 14"-wide tabletop. (We cut three pieces 4¾" wide by 54" long. Then, we jointed the mating edges, and edge-joined the boards. Next, we trimmed the ends flush for a 53" finished length and trimmed the front edge for a 14" finished width.)

2 Cut the cleats (H) to size. Drill and countersink the screw holes in each cleat where shown on the Cleat detail. Then, drill overlap-



ping 3⁄16″ holes to form the slots where shown on the detail. The slots allow the mounting screws to move slightly as the tabletop expands and contracts, preventing the tabletop from splitting.

3 Screw the cleats to the inside edge of each upper side apron (E), and flush with the top edge of the aprons.

4 Attach an edge guide to your router. Fit your router with a ½″ straight bit. Set the guide and make a cut about ⅜″ wide by ⅛″ deep around the top perimeter of the table as shown in the photo *below right*. If you don't have a router edge guide, clamp a straightedge to the tabletop and run the router along it.

5 Continue to reset the guide (or straightedge) and make the routing cuts until the rabbet is 1″ wide as shown in the photo. *While making the second and third passes with the router, be careful when you come to the ends of the tabletop to keep the base of the router flush with the top of the tabletop. The router and bit have a tendency to dip as the router base passes over the previously cut rabbet at the corner.*

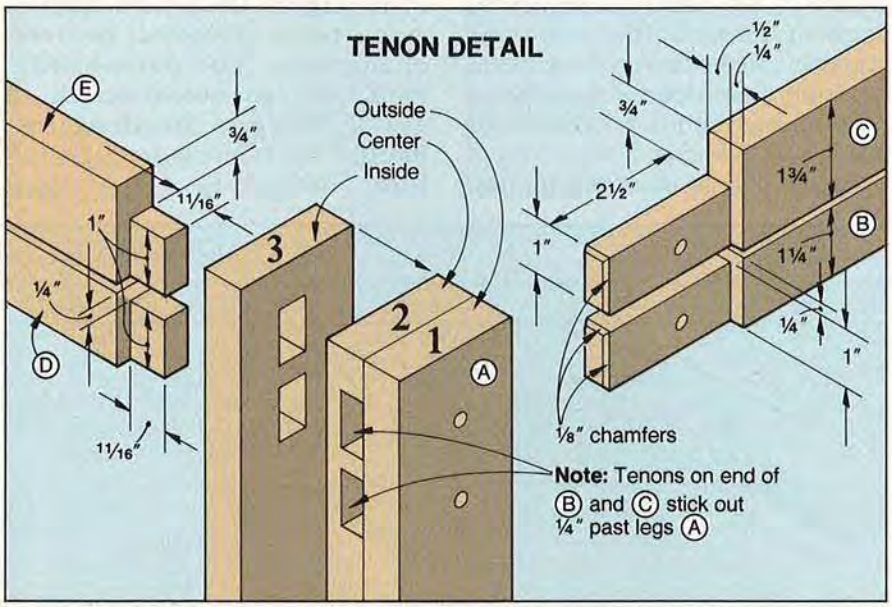
6 Scrape and sand the rabbet to remove the routing marks.

7 Sand the base and top. Stain as desired, and add the finish.

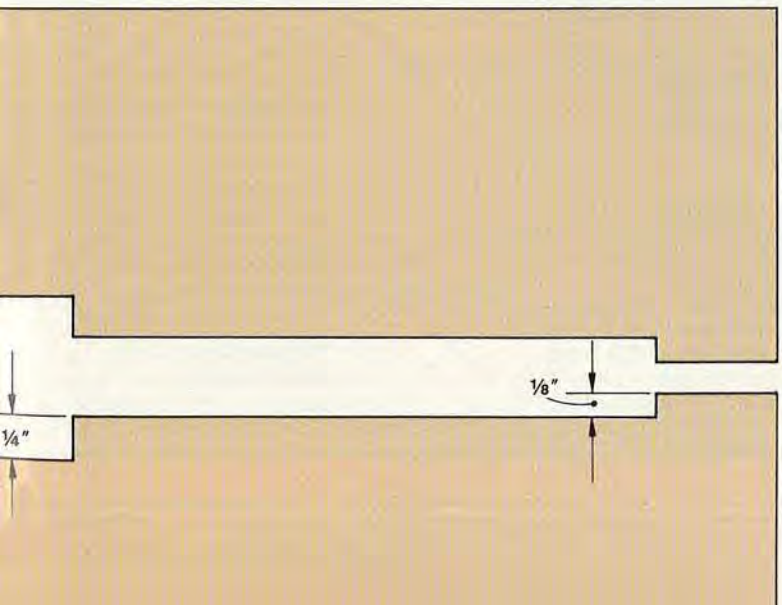
8 Center and lightly clamp the top onto the base, being careful not to mar the finish. Using the previously drilled holes in the cleats as guides, drill 7⁄64″ pilot holes ¾″ deep into the bottom side of the top.

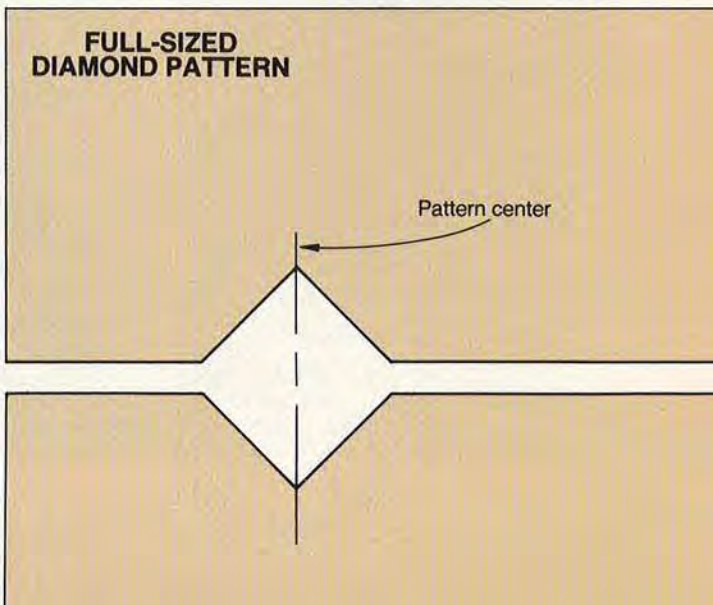
9 Drive the center #8×1¼″ pan head screw through the cleat and into the table bottom. For the outside cleat screws, add a flat washer to the screws before driving them in place. Do not overtighten the outside cleat screws—you want them tight enough to hold the top flat, yet loose enough to move in the 3⁄16″-wide slot when the wood in the tabletop expands and contracts.

Project Design: James R. Downing; Marlen Kemmet
Photographs: Hopkins Associates
Illustrations: Kim Downing; Mike Henry

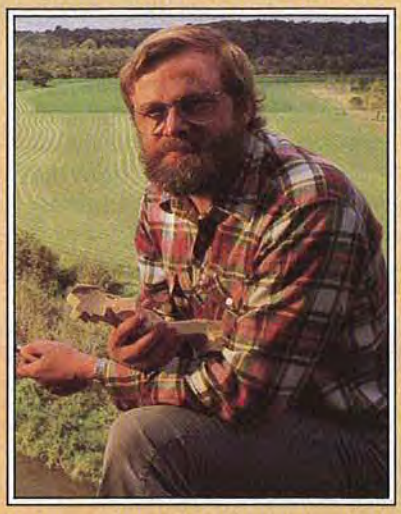


Fit your router with an edge guide and a straight bit. In several passes, rout a ⅛″ rabbet 1″ wide along the tabletop edges.





HOW TO SHOP SMART FOR CARVING



"My students often bring cases of carving tools to my classes, so they're usually surprised to find out that I rely on only six tools for the bulk of my work. In a sense, many beginning carvers go full circle in buying lots of carving tools before becoming comfortable with just a few of them as they gain experience."

—Harley Refsal
***WOOD*® magazine's carving consultant**

Print this article

Those of you who have shopped for carving tools know firsthand what a hit-and-miss affair it can be. The instant you make a trial cut with your new purchase, you very well may realize you laid money down for the wrong tool. But armed with the right information, this doesn't need to happen.

Because most of us tend to gravitate toward one style of carving, be it human figures, relief, wildlife, or chip carving, (see the explanation of these styles *on page* 43) we asked an expert in each of these fields to tell us about his or her favorite tools. All of them volunteered eagerly to pass along their best tidbits of buying wisdom.

As you'll soon discover, finding the tools that suit your style and pocketbook requires only that you follow a few basic guidelines, mixed in with some sound advice and your own common sense.

First, a refresher course

Before we introduce you to our esteemed carvers, we'd like to give you a carving tool-refresher course (see the chart *below*). As you look at the traditional carving tools, remember these two points:

- Except for the bench knife, these tools come mounted in one of the three illustrated handle styles: palm, elongated, or interchangeable. The palm-handle tools have an overall length of 4½–5", whereas the elongated-handle tools measure 9½–11" long, including 3½–4"-long

AT-A-GLANCE GUIDE

TRADITIONAL CARVING

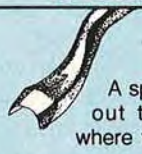
Bench knife
Essential for most figure carving. Modified versions needed for chip carving.

Gouge
Available in many different sweeps. An excellent tool for quickly removing stock.

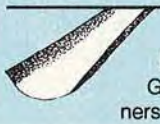
Bent gouge
Bend helps you smooth concave surfaces.

Spoon gouge
The table-spoon shape helps you reach tight areas.

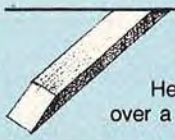
Veiner
The U-shape of this versatile tool makes it well suited to fluting and preliminary outlining of relief carvings.



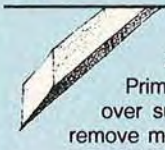
Back-bent gouge
A specialized tool for cleaning out the underside of a cut where top clearance is limited.



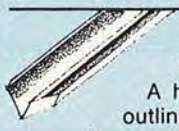
Fishtail gouge
Good for cleaning out corners and undercutting.



Chisel
Helps you flatten or round-over a surface.



Skew chisel
Primarily used for rounding-over surfaces. Point helps you remove material from tight areas.



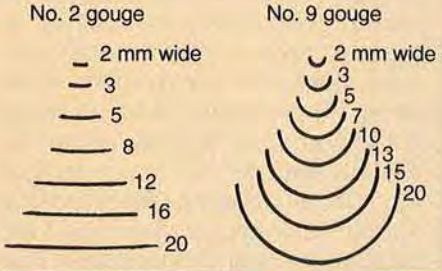
V-parting tool
A handy tool for making outlining cuts and textured lines such as hair or veins.

TOOLS 4 pros tell how they choose the tools of their trade

blades. You can buy elongated-handle carving tools in a far greater array of sizes and styles than palm-handle versions. Interchangeable handles are about 4" long and come in several shapes.

• The cutting edges of these tools come in various widths (measured in millimeters or inches) and curvatures (known as sweep). As shown in the drawings *below left,* carving tools are numbered like golf clubs with a No. 2 gouge having a shallow sweep, and a No. 9 gouge having a good deal of sweep. Gouges numbered between 2 and 9 have degrees of sweep between these two extremes.

***Note:** See the article on page 69 for more buying pointers.*



4 WOODCARVING PROS SPEAK OUT

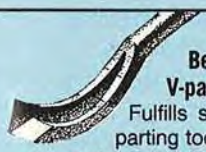
Now that we've given you some general background, select the carver on the next four pages most suited to your style and read on to get the low-down on your favorite type of carving.

Our four pros specialize in these areas: relief, chip, wildlife, and figure carving. Most beginners will have their greatest success in relief and chip carving, both of which require you to carve a flat piece of stock.

Human figure carvings can be as small as your thumb, or larger than life-size, but we advise you to start with smaller subjects in easy-to-carve and less-expensive woods (such as basswood or butternut). Most figure carvers we've run across still rely on traditional carving tools. On the other hand, wildlife carvers generally shape their ducks, fish, and other game with power rotary tools.

Continued

TO CARVING TOOLS



Bent or spoon-shaped V-parting tool
Fulfills same purpose as a V-parting tool, but shape helps you get cutting edge into tight spots.

Long-bent V-parting tool
The long bend helps you make cuts on concave surfaces.

Elongated handle
Equally useful for carving with just your hands or with hands and mallet.

Palm handle
Some people prefer the feel of a handle they can hold in their palm. Cannot be used with a mallet.

Handle for interchangeable blades
Changing blades requires a few seconds. Made by the Warren Tool Co.

POWER CARVING

Flex-shaft power carver
These machines help you quickly remove stock and have become the tool of choice for most wildlife carvers. The flexible shaft relieves hand fatigue and gives you greater control because an upright rod (called a motor hanger) supports the motor housing. Extra torque helps make fast work of deep cuts in tough materials. A variable-speed foot control allows you to keep your hands free to hold tools and work.

Hand-held motorized tool
Works much like a flex-shaft power carver, but more cumbersome because you hold motor housing in your hand. Less expensive than a flex-shaft carver.

High-speed steel cutter
Cut fast. Available in many shapes, and in tungsten-carbide for longer life.

Structured-tooth tungsten-carbide cutter
These bits make for controlled cutting because they work equally well with, and against, the grain.

Ruby cutter
Good for smoothing and carving intricate details.

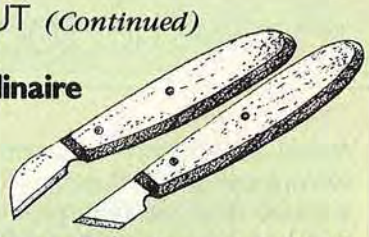
Sanding drum
Many sizes and grits available for smoothing broad areas.

4 WOODCARVING PROS SPEAK OUT *(Continued)*

Wayne Barton: chip carver extraordinaire

Few carvers pursue their craft with the passion that Wayne Barton pours into chip carving. He's generally recognized as one of the foremost experts in his field, and it's easy to see why. When he's not operating the Alpine School of Woodcarving in suburban Chicago, he's probably making one of his three or four annual treks to Switzerland to lead tour groups and teach chip carving. Or, he's holding a chip-carving seminar at a woodworking show somewhere in the U.S.

Wherever he may be, Wayne quickly points out the merits of chip carving. As he told us: "Compared to other forms of carving, chip carving is more technique than art. Once you know the technique, you can find quick success in this craft. And, it's very economical. You need only two knives: a cutting knife and a stab knife (shown *above*). That's it.

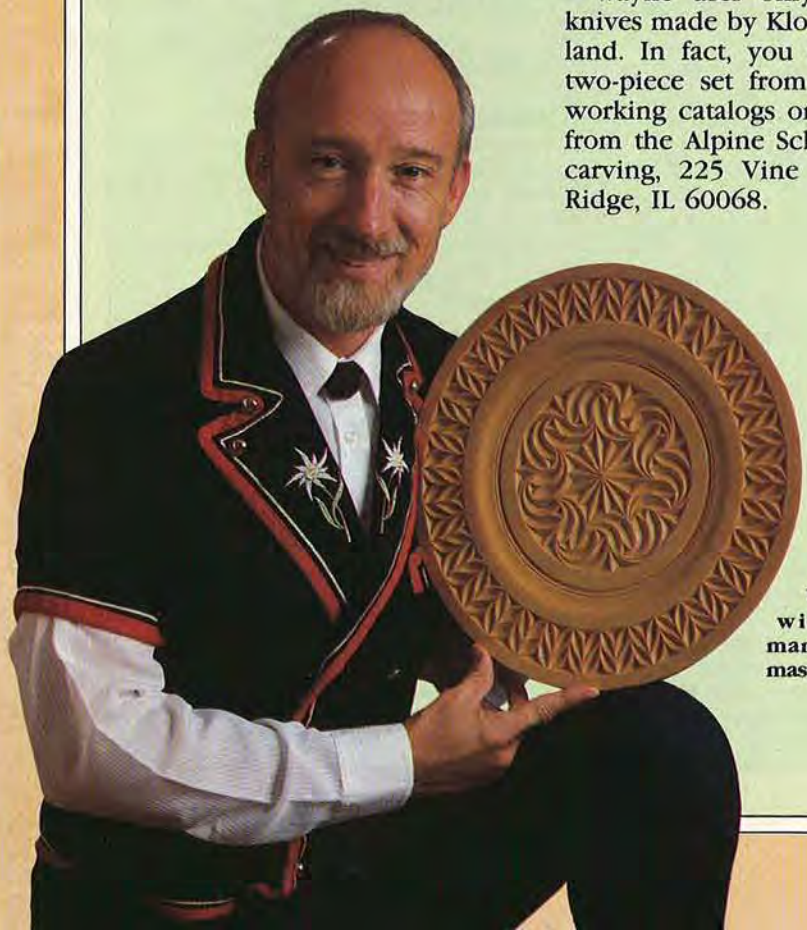


Chip carvers need only two tools for all of their work: a cutting knife *(top)*, and stab knife.

"The cutting knife is your primary tool, and it does all the chip removal. You use the stab knife mostly for decorative touches. It cuts and spreads the wood fibers to make a wedge-shaped mark, but it doesn't remove the wood," he explained.

Since many carving catalogs show ten or more different chip-carving knives, we asked Wayne how he gets by with just two. "All those knives shown in catalogs were developed for other forms of carving, and somebody decided to sell them as chip-carving knives, but they have no use in chip carving," he told us.

Wayne uses only chip-carving knives made by Klotzli in Switzerland. In fact, you can order his two-piece set from many woodworking catalogs or for $24 ppd. from the Alpine School of Woodcarving, 225 Vine Avenue, Park Ridge, IL 60068.



Wayne Barton with one of his many chip-carving masterpieces.

Cathy Blackwood: relief carver

When we first contacted Cathy about this story, she was rushing out the door of her Soldier, Kansas, home on her way to teach a carving seminar. "Most of the carvers I work with are beginners, so I have a pretty good feel for what they need," she said to us. When we next talked to her, she had a little more time and told us which tools an aspiring relief carver needs to get a good start.

"I like palm-handle tools because their smaller size gives me greater control. Fortunately, I started with two good brands of tools—Harmen and Dastra—and I've always been happy with them. These tools hold an edge well, and only require an occasional honing." Cathy buys her tools from Laughlin Woodcarving Supply in Harrison, Arkansas (see *page* 47 for the phone number).

Cathy feels that beginners should start with shallow relief carvings and use these tools:

- Harmen ¼" long-bent V-parting tool for outlining and cleanup.
- Harmen ½" No. 7 gouge for wood removal and shaping.
- Harmen ½" No. 3 gouge for rounding edges, shaping and smoothing unwanted gouge marks.
- Harmen 117 gouge (about 5⁄32" wide), a miniature tool for details.
- Dastra 203 2mm spoon chisel for hard-to-reach areas.

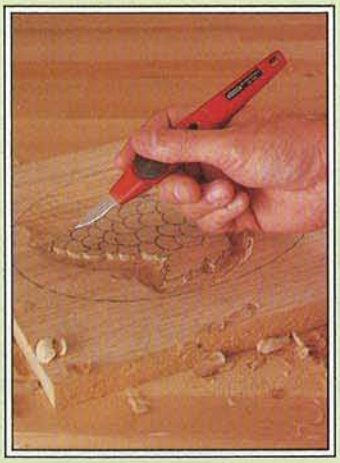
Cathy Blackwood especially likes doing relief carvings of outdoor scenes.

who knows beginners' needs

• Stanley No. 28-109 retractable knife (see photo at *right*) for cutting, shaping, and cleaning. "For beginners, I prefer the Stanley retractable model over a bench knife because the blades are flexible and disposable.

"For the carver ready to take on deeper relief carvings, and those with more fine detail, I suggest making an investment in a Harmen ¼" No. 3 special-design gouge, Harmen 117R miniature V-parting tool, and Dastra 205 4mm gouge."

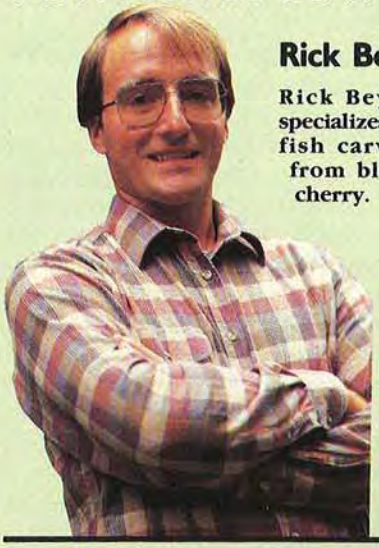
For a look at another relief carver's perspective on a good beginner's set of carving tools, see the project on *page* 49.



Beginning carvers can avoid sharpening chores by using the Stanley retractable knife.

CARVING TOOLS

4 CARVING PROS SPEAK OUT *(Continued)*



Rick Beyer: wildlife specialist

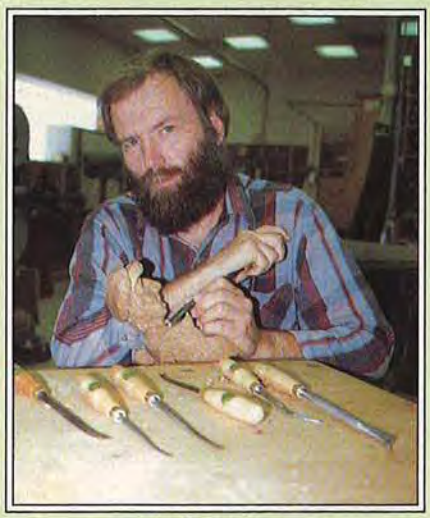
Rick Beyer specializes in fish carved from black cherry.

Like most wildlife carvers, Rick Beyer of Racine, Wisconsin, devotes his time to power carving. "It kicks up a little dust, but a power carver helps me work much faster than I could with traditional tools, and with greater control," Rick told us.

Even if you're just getting started in power carving, Rick suggests you start with a flexible-shaft power carver rather than a hand-held motorized tool. "You simply can't do detail work with hand-held tools because they're too awkward and cause too much hand fatigue. For example, details such as bird feathers require that you get your hand in a rhythm, and you can only do that with the smaller and lighter handpiece of a flex-shaft machine."

Rick prefers using structured-tooth, tungsten-carbide cutters for shaping, and ruby cutters for smoothing and fine details. "These bits cost more than high-speed steel cutters, or abrasive

Fred Cogelow: he brings large figure carvings to life



Fred Cogelow

When you see a Fred Cogelow carving, it's hard not to be moved. Many of his carvings, such as the life-size sculpture entitled "With Thoughts of Mabel," (see detail photo *opposite page, middle*) convey a strong message about the lives of the rural people Fred has come to know around his home in Willmar, Minnesota.

Fred keeps some 400 chisels and gouges in his shop, and another 50 or so knives, palm chisels, and dental picks within easy reach, so we weren't surprised when he hesitated before recommending a few essential tools. "I'm a big believer in spoon gouges," Fred told us. "The spoon-shaped tools work well with a mallet, yet provide great accessibility to recessed areas. For the beginner, I recommend these spoon gouges: two No. 5's in ¼" and ¾" widths, a ½"-wide No. 9, and a ⅛"-wide No. 11. Also, a ¼" spoon-shaped V-parting tool will come in handy."

Because of the large size of most of his workpieces, Fred prefers tools with elongated handles. As he told us: "The palm handles just get in my way." And, he believes in buying well-made tools.

Duck carving by Randy Hansen, Des Moines

stones, but give you a lot more control and last much longer."

If you're a rookie to power carving, Rick suggests you start with the less-expensive ⅛"-shaft tools. "Don't make the move to ¼"-shaft-and-larger tools until you get really serious," he advises.

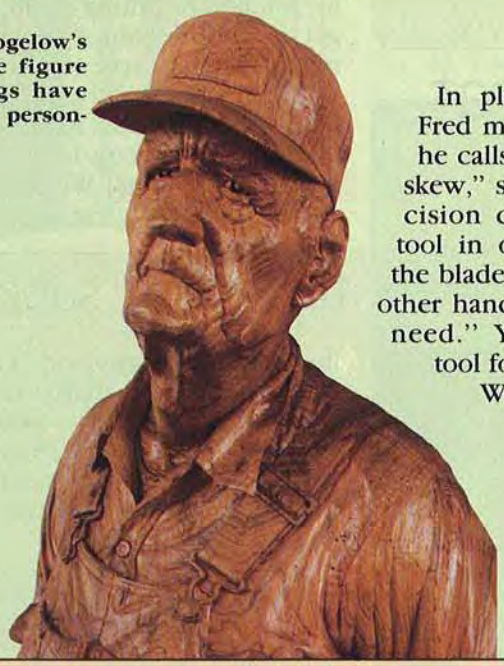
Rick cites these bits as the ones he uses most often:

- A teardrop-shaped ruby cutter that's about ¼" wide at its broadest point (see the one in the carving tool guide on *page* 43).

- Two structured-tooth bits: one that's long and thin such as the one shown in the carving tool guide on *page* 43, and another that's shorter, wider, and shaped like a barrel.
- Various sanding drums in coarse and fine grits.

"It pays to buy high-quality brands, such as Ashley Iles, Henry Taylor, Hirsch/Two Cherries, or Swiss-made, because these tools will last a lifetime."

In fact, Henry Taylor manufactures several carving sets with tools forged to Fred's specifications. The tools in these sets reflect his preference for bent (spoon-shaped) blades. For example, the 7-piece Henry Taylor set contains one bent skew chisel, four bent gouges, and two backbent gouges.



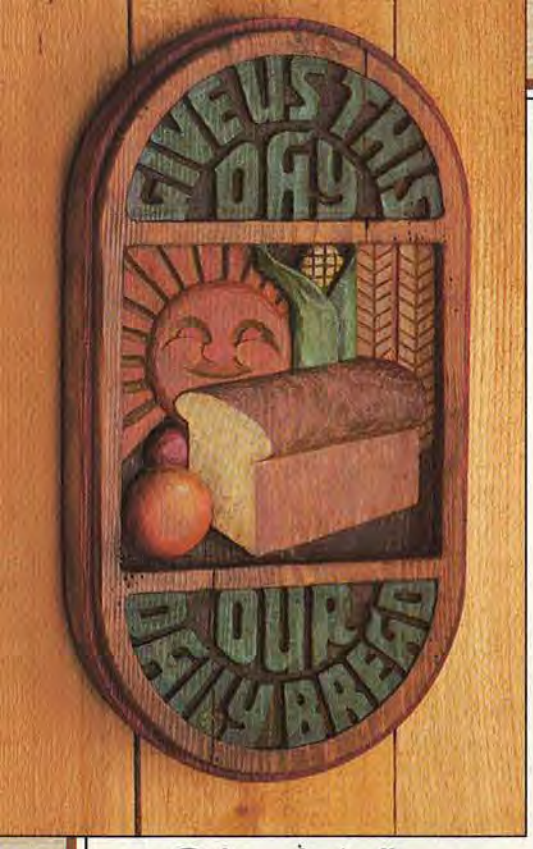
Fred Cogelow's life-size figure carvings have distinct personalities.

In place of a bench knife, Fred makes great use of a tool he calls the "Cogelow ½" bent skew," shown *at far left* for incision cuts. "By grasping the tool in one hand, and guiding the blade with two fingers of my other hand, I get all the control I need." You can purchase the tool for $22.95 ppd. from The Woodcraft Shop through the phone number in the box *below*.

Sources for carving tools and literature:

Garrett Wade 212/807-1155	Laughlin Woodcarving Supply 501/741-4757	Warren Tool Co. 914/876-7817	Woodcraft Supply 800-535-4482; 304/428-4866
Ivan Whillock Studio 507/334-8306	The Woodcraft Shop 800-397-2278; 319/359-9684	Wood Carvers Supply 804/583-8928	

Written by Bill Krier Illustrations: Jim Stevenson
Photographs: Perry Struse; Bob Mischka; Brent Photography & Associates; Bob Calmer; Hopkins Associates; Robert M. Miller



NATURE'S-

Oh, What A Relief It Is!

Now that he's retired, Robert Thomas Jr. of Columbia, Maryland, spends most of his time carving wood. After 40 years as a graphic designer, he seems to have found a second career in carving.

His background in the graphic arts and appreciation of wood carving go together well, as evidenced by this strong, clean design on four relief levels. The harvest still-life and the words from *The Lord's Prayer* combine to make a handsome decoration for kitchen or dining room. You'll get to try a cornucopia of techniques as you carve it, too.

Thomas loves carving, but he confesses that there is one aspect of it he finds pretty tough—coming up with ideas. We think he's come up with a great one here.

Getting down to work

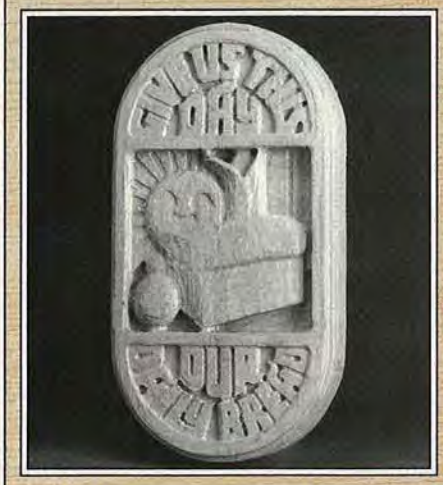
Enlarge the pattern on page 49 onto an 11×17" sheet with an enlarging photocopier. You can order a full-sized pattern or 70 percent roughout; see *below.* If starting with a roughout, go to *Digging into details* on page 50.

Lay out the pattern on the bark side of your blank—the side that was toward the outside of the tree. (Check the end grain where the annual growth rings form arcs. The tops of those arcs point to the bark side.)

Trace the pattern lines with a colored pencil so you can see where you've been. Use a straightedge and French curve to maintain straight lines and smooth curves as you trace.

Remove the paper pattern, and straighten and redraw the lines as

You'll need these tools and supplies



You'll need a 2×9×17" slab for your carving. We used butternut, a hardwood that carves easily and finishes beautifully. You also could choose basswood, jelutong, or sugar pine.

Or, order a presawed blank or a 70 percent roughout in either butternut or basswood. Cost for the bandsawed blank is $9 in basswood or $11 in butternut. Roughouts sell for $15 in basswood or $17 in butternut. All prices include U.S. postage. Available from:

Duplication By The Dozen
Daily Bread Plaque
1447 S. Santa Fe
Wichita, KS 67211
1-800-8-BLANKS

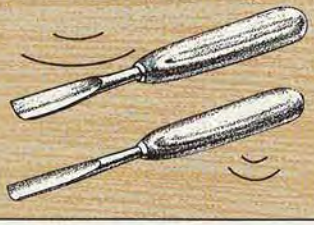
Knives

Chip-carving knife

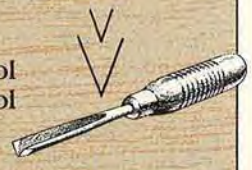
Bench knife

Gouges

¼" No. 3 gouge
¾" No. 3 gouge
⅛" No. 7 gouge
¼" No. 7 gouge



⅛" No. 41 V-tool
¼" No. 41 V-tool



Strop and slipstone

Finishing materials

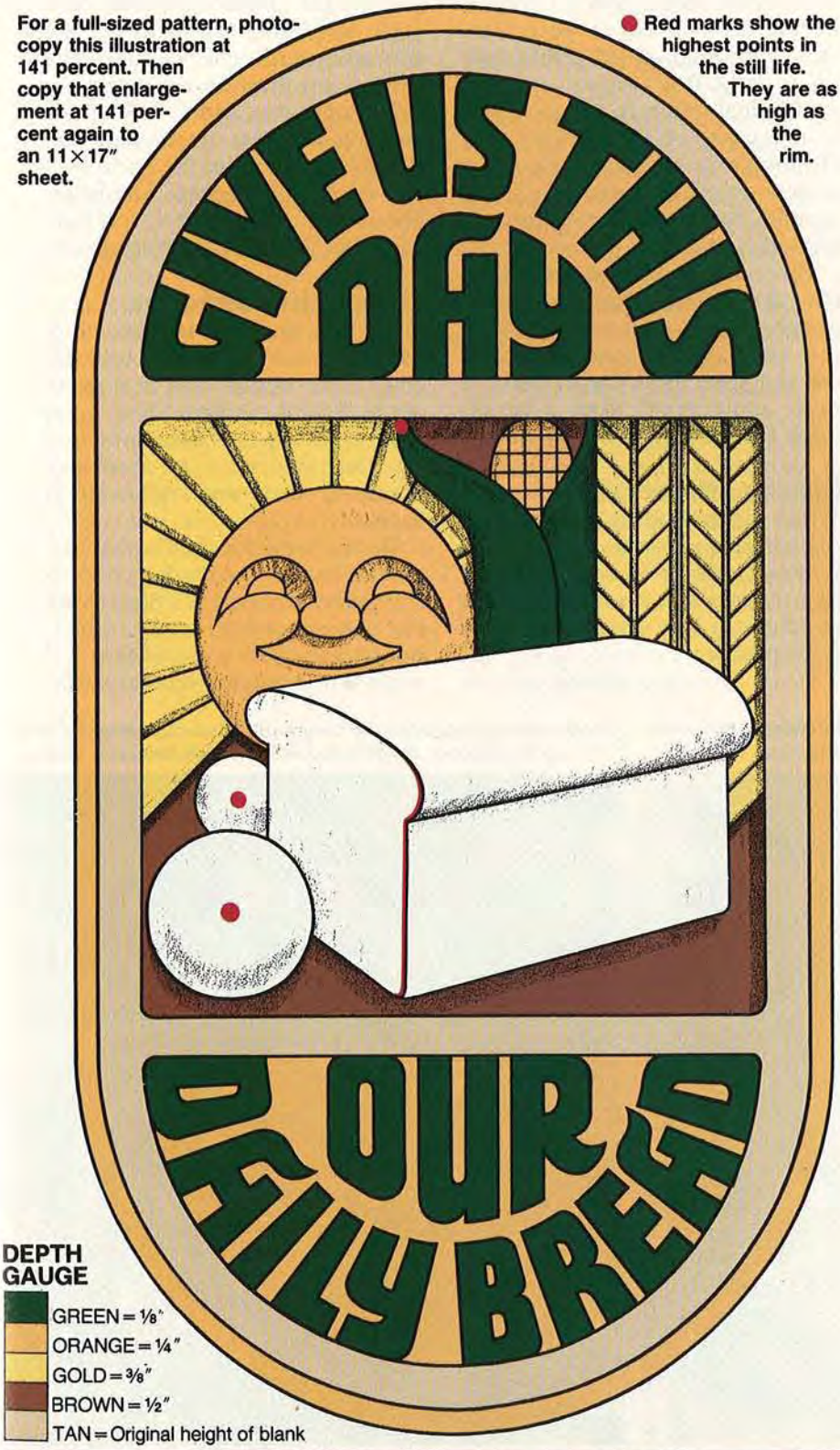
Water colors or acrylic paints in green, red, orange, yellow, and magenta (deep, reddish purple).
Walnut oil stain
Clear finishing oil

Full-sized pattern

Send $1 (U.S.) and a stamped, self-addressed, business-sized envelope to:

OUR DAILY BREAD
WOOD® magazine
Box 11454
Des Moines, IA 50336-1454. (Foreign readers: include international reply coupon.)

GOODNESS WALL PLAQUE


For a full-sized pattern, photocopy this illustration at 141 percent. Then copy that enlargement at 141 percent again to an 11×17″ sheet.
Red marks show the highest points in the still life. They are as high as the rim.
GIVE US THIS DAY
OUR DAILY BREAD
DEPTH GAUGE
GREEN = ⅛″
ORANGE = ¼″
GOLD = ⅜″
BROWN = ½″
TAN = Original height of blank

needed. Now, locate and mark the relief's high points as indicated on the pattern. After transferring the pattern, spray a light coat of artist's fixative or clear shellac over the plaque's surface to prevent smearing the lines.

Bandsaw the blank slightly outside the outermost pattern line, then sand down to the line. Rout the ¼″ rabbet ⅜″ deep around the plaque's edge. A 5/16″ piloted rabbet bit will do the trick.

Bringing the still to life

Make stop cuts around the still-life elements using a chip-carving knife or V-tool. (We chose a ¼″ No. 41 V-tool.) Be sure to keep

Hold the V-tool with the working edge vertical for stop cutting. Additional wood has been removed for clarity.

the side of the V-tool that is against the working edge vertical so you won't undercut the line or leave a sloping edge (see the photograph *above*).

With the first round of stop-cutting done, move to the deepest relief area as shown on the pattern and begin *grounding* the plaque. This is the process of removing wood to establish the relief levels.

Continued

NATURE'S GOODNESS

▲ Check relief levels during grounding with the depth gauge and a straightedge. The color-coded pattern shows depths for grounding the plaque.

Copy the relief depth gauge, found next to the plaque pattern on page 49, to light cardboard, such as an index card. Check the depths as you carve your way down to final relief levels (see photo *left)*. Don't try to get down to the final depth in one cut; take it in stages of stop-cutting and cleaning out. And, don't focus too closely on a particular area; move around the plaque, working each section a little at a time.

There isn't any one prescribed tool for grounding; the knife, gouges, and V-tools all will come into play. A foam pad under the carving (we used carpet pad) is more convenient than a bench hook for holding this project.

Digging into details

When the grounding is done, start modeling the details. Redraw the wheat heads, the corn kernels, and the sun's face and rays. Trace another sun face onto scrap wood for a practice carving.

Study the face details in the photo *below left* and the contours indicated by shading on the pattern as you fashion the face. Carve the mouth about 1/16" wide with your 1/4" V-tool. Stop-cut around the smile lines, cheeks, nose, and eyes. Form the features with your 1/8" gouge and knife. Follow the shading to carve the contour under the nose and at the corners of the eyes. The deepest points are about 1/16". Check often for symmetry as you carve the face.

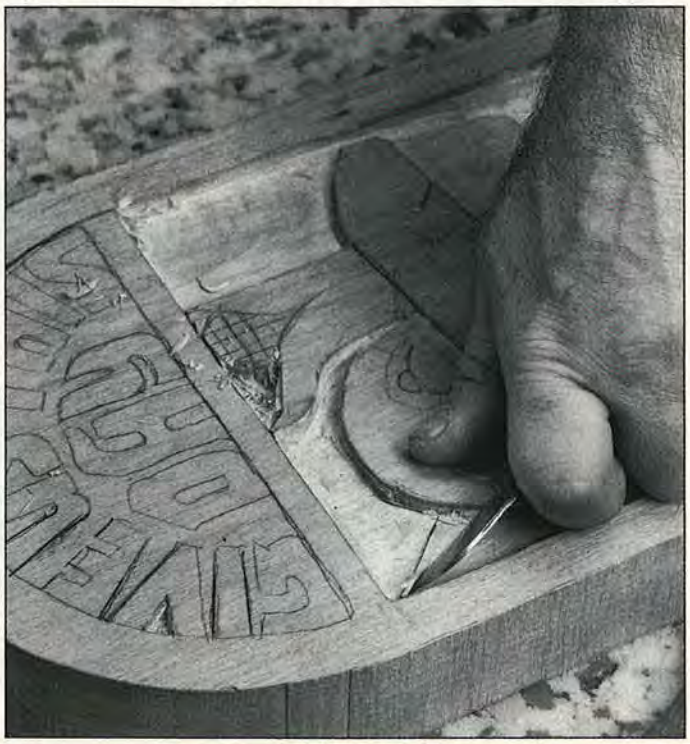
Try another technique

Now, you can turn to some chip-carving methods to detail the sun's rays. Begin with a stop-cut along the pattern line. Then, make angled, slicing cuts (photo *below)* on each side of it to form a V about 1/8" deep and 3/16" wide at each ray.

Do the same for the lines on the wheat heads, but make your Vs narrower—about 1/16". Square up the line separating the wheat heads and cut it to about 3/16" wide with straight, vertical sides.

▼ A close-up of the still life shows the relationship of the major elements. Shallow cuts create the details of the sun's face.

▼ Make slicing cuts with the chip knife when detailing the sun's rays. Carve the corn kernels and wheat heads the same way.



Carving the corn

Start from the high point on the left husk and taper down to about ⅛" below the surface at the top of the loaf. Develop a pleasing curve and round over the edges as you carve. Make a stop cut along the line between the husks and carve the right husk about 1/16" lower than the left. Separate the kernels with chip-carved lines.

Making the bread

The bread loaf is carved in perspective, so you'll be carving down from the high point in two directions. Study the detail photograph and the pattern shading as you taper the loaf to about ¼" below the surface at its right end. Depths to the left of the high point vary. Carve the top corner of the loaf to be slightly higher than the sun's face—1/16" is fine—and work down to about ¼" deep where the loaf meets the orange.

Stop-cut the line separating the top and bottom of the loaf with the V-tool, keeping the vertical side of the tool toward the top of the loaf. Follow the shading on the pattern to complete the loaf and finish the two fruit shapes.

Meet the lettering challenge

Now, it's time to try out your lettering skills. Clean cuts, straight lines, and vertical sides are crucial, particularly in the low-relief, monument-style lettering you'll be doing here. Take your time and keep your tools honed for sharp-looking lettering.

Stop-cut the letters with the ⅛" V-tool as shown *below left.* Make stop cuts on the inside curves of letters (such as the inside of the O) with a ⅛" No. 7 gouge. Stab the gouge vertically into the work surface and rotate it slightly to carve the inside radius (see photo *below right).* Connect the radius cuts with straight knife cuts and pop the interior waste out. After the lettering is completed, use the shallow gouge to pare the faces of the letters down about ⅛" below the rim of the plaque.

Wrapping things up

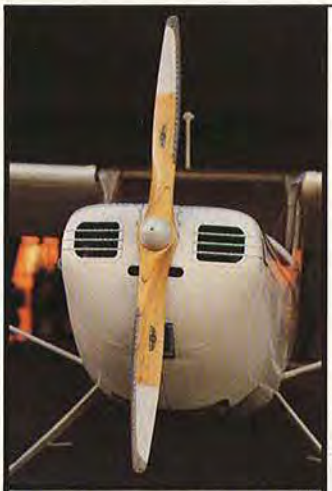
When you're finished, take a close look at your carving—a final, critical inspection. Touch up any cuts that aren't quite right and clean out fuzzy spots. Sand the uncarved, raised rim to remove traces of fixative, but don't sand the carved areas. They don't need it, and, anyway, you don't want to remove any of your tool marks—they're part of the character and texture of hand-carved work.

We used watercolors to finish the lettering and still life, but thinned artist's acrylic colors work great, too. You can follow the scheme shown in the color photograph on page 48 or devise your own. We gave the deepest relief area two applications of Watco medium walnut stain and put a single application on the area behind the lettering. Finally, we applied Watco oil finish to the entire plaque before hanging it up for all to enjoy.

Written by Larry Johnston with Jim Barnett
Photographs: John Hetherington
Illustrations: Jim Stevenson

▼ **Stop-cut the letters with your ⅛" V-tool. Keep the cutting edge vertical so that the sides of the letters will be straight.**

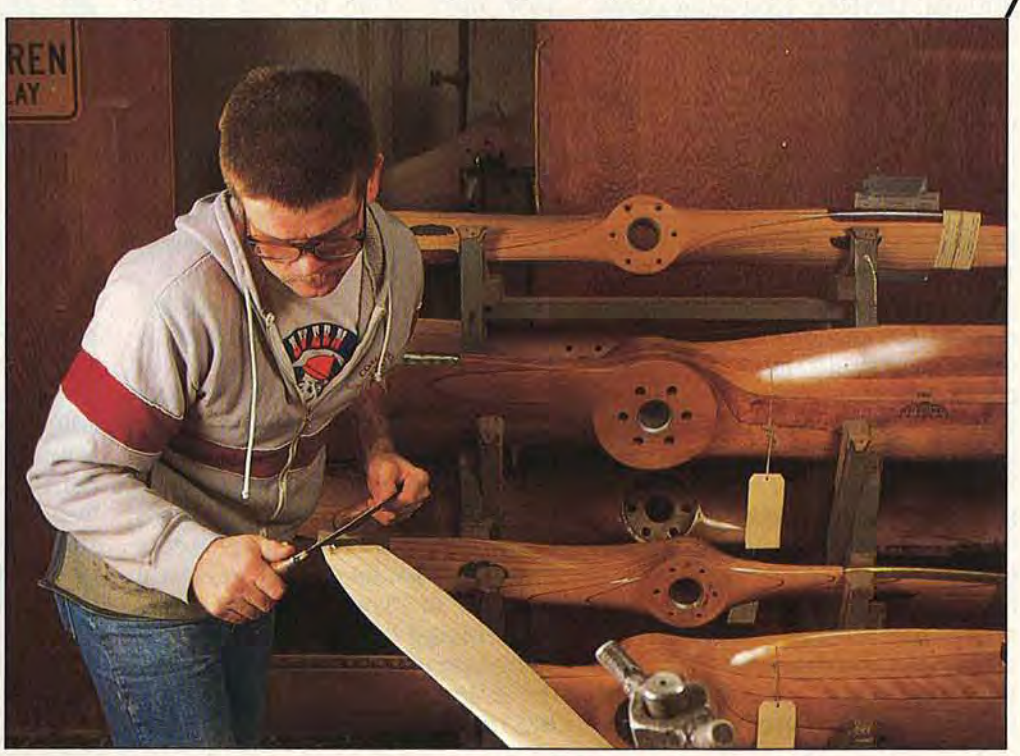
▼ **With a No. 7 gouge held vertically, make a twisting cut to stop-cut the curved interior lines on the letters.**



Owners of vintage aircraft, such as this Cessna 120, keep Sensenich turning out propellers. This 72" model of laminated yellow birch sells for $600.

JUST PLANE

Made the old-fashioned way



Kevin Wealand trues up a propeller's leading edge by trimming excess wood off with a spokeshave. Because it's easier to work than maple, and doesn't splinter like oak or walnut, Canadian yellow birch has proven to be the perfect propeller stock.

In 1932, some 29 years after Orville and Wilbur Wright rose above the sands at Kitty Hawk, two other brothers, Harry and Martin Sensenich, turned out their first wooden propeller. However, it went on the back of a motorized snowsled they operated for fun on the frozen Susquehanna River near their farm in Lancaster, Pennsylvania.

The Lancaster airport was nearby, though, and before long, the Sensenichs began making propellers for small aircraft. Nearly 60 years and hundreds of thousands of propellers later, the process they perfected in those early days lives on.

Wooden props get a lift

Much has changed at the family-run company in the last half century, and much has not. First known as Sensenich Brothers, the company swelled to about 400 employees during World War II, when laminated wooden Sensenich props carried aloft squadrons of trainer planes.

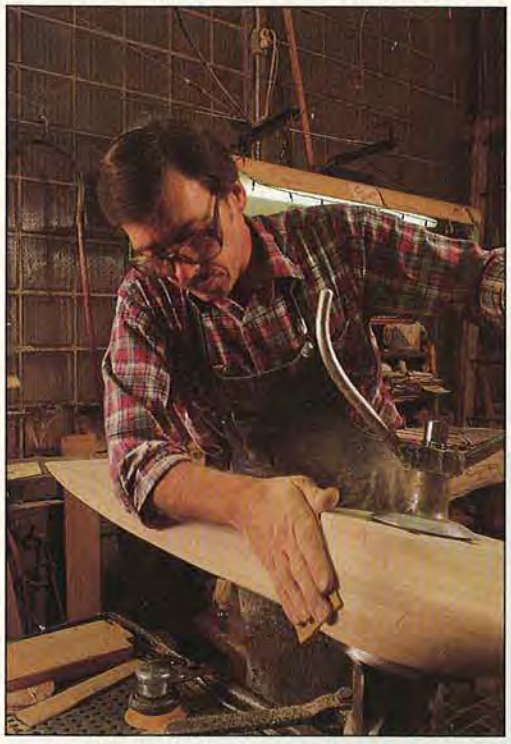
Faced with declining demand following the war, the brothers diversified into butcher-block tabletops and, for a time, even bowling pins. In 1948, they made their first metal prop, and still produce about 1,500 annually.

In 1990, after shutting down the butcher-block division, the family sold the aviation and propeller business to Philadelphia Bourse, Inc. The investors recognized a quality operation all alone in an attractive niche market.

Now, the Sensenich Propeller Company also runs a repair and service division for prop-driven commuter airlines. It's the wooden propel-

Print this article

PROPELLERS
-out of wood



Al Dissinger gives a propeller an extensive sanding with 100-grit paper before it goes to the finishing room.

After taking shape on the profile machine, a propeller must be checked with templates. Kevin Hostetter removes rough spots.

ler manufacturing, though, that's growing the fastest—up to 2,000 in each of the last two years. And it's this aspect of the business that has hardly changed at all.

The wooden-prop shop, the real heart of Sensenich, looks much as it did a half century ago. The aged oak floor may be several shades darker now, and the glass block interior walls harbor sawdust of mixed vintage in their cavities and crevices. And, the process follows that established decades ago as well. In fact, only the formulation of the glue has changed.

A whirl for Canadian birch

Sensenich craftsmen still use only straight-grained, 1" thick, Canadian yellow birch for the laminated props. Depending on the model—and the quality of the hardwood—a propeller requires from 5 to 13 laminations of birch.

"The Piper J-3, for instance, was traditionally made with five," explains Edward Zercher, sales manager. "When the wood wasn't quite up to snuff, we used 11, but the product was heavier."

Sensenich craftsmen have from time to time experimented with other woods. "Early on we tried hard maple," says Zercher, "but it was tougher on machinery. At the same price, birch is much easier to tool. And, walnut and oak splinter too much."

Many of the mark-off patterns, or tracing forms, for the first rough cuts on the laminated propeller stock are decades older than the employees using them. The shop machines that roar noisily and fill the air with sawdust also go way back.

They include the router, responsible for the initial shaping of the propeller blades and, most notably, the profiler, which makes the last mechanical cuts.

Continued

A Sensenich propeller has 5 to 13 laminations and two protective coats of dipped-on spar varnish.

By special order, Sensenich provides custom propellers for homebuilt experimental aircraft.

JUST PLANE PROPELLERS

Each prop then undergoes hand finishing with spokeshaves, drawknives, scrapers, and sandpaper.

Until recently, Martin Sensenich, in his eighties and chairman of the board, remained the only one to tinker with the profiling machine he designed and built in decades past. "Whenever the machine broke down, the word was: 'Go get Martin'," says the sales manager. Even today, when workers check their instructions for setting the profiling machine for various models of propellers, they thumb through the original blocking book, a three-ring binder. In it, on brittle, yellowed sheets of notebook paper, they find the detailed, handwritten instructions of Harry and Martin Sensenich.

A new spin on the propeller market

What makes the wooden propeller market turn these days? Nostalgia for one thing. In this case, a back-to-basics trend among the many restorers of old single-engine Pipers, Fairchilds, Cessnas, and Aeroncas.

Decades ago, many owners of such planes, seeking the latest technological advances, switched to metal props—their thinner blades hailed as more efficient. "Now, wooden props are the rage," says Zercher.

But many owners, he adds, find pleasure with more than the look of the spar-varnished propellers. Wooden props are lighter. They also vibrate less, creating a smoother ride. They may be

The demand for wooden props has swelled to 2,000 per year. Besides these aircraft models, the company also builds props for airboats and unmanned surveillance planes.

safer, too. A growing crack that might disable a metal prop likely will stop at a glue line on a wooden one.

Wooden props also cost about one-fourth the price of metal ones. In a time when two bags of groceries can total $30 to $40, a finely crafted wooden propeller for $500 seems a bargain. That's for one of Sensenich's smaller props—a 72" tip-to-tip propeller for a Piper J-3 Cub. The tab runs to $1,135 for a 98" PT-17 Stearman prop.

But vintage aircraft propellers account for only about one-fourth of Sensenich's annual production of wooden propellers. About half of the output serves the airboat industry. "There are about 7,000 airboats in the state of Florida, and another 3,000 in Texas and Louisiana. And, their owners do like to have a good time with them," chuckles Zercher. "Our best customer, named Buck, goes through four a year."

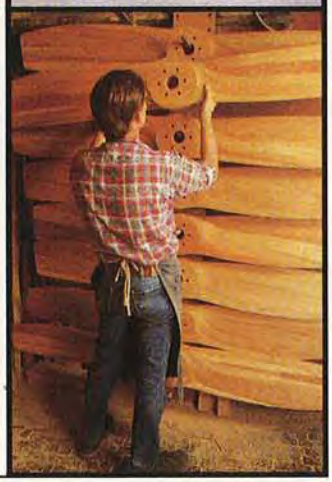
A much less obvious clientele describes the third market—those governments that operate radio-controlled, unmanned surveillance planes. Sensenich builds as many as 800 of these 29" props a year for military contractors. Most of them end up in foreign hands over foreign lands.

And then there's the growing market serving homebuilt or kit planes. "These guys spend years building their planes and generally get so sick of it, they decide to buy the prop," says Zercher. And when they do, they get a piece of aviation history.

Airboat propellers receive metal tips and protective edges. Here, Randy Goshert checks the tightness of the wrapping that holds the metal edge so that it can be riveted and screwed in place.

Written by John Grossman Photographs: Jerry Irwin

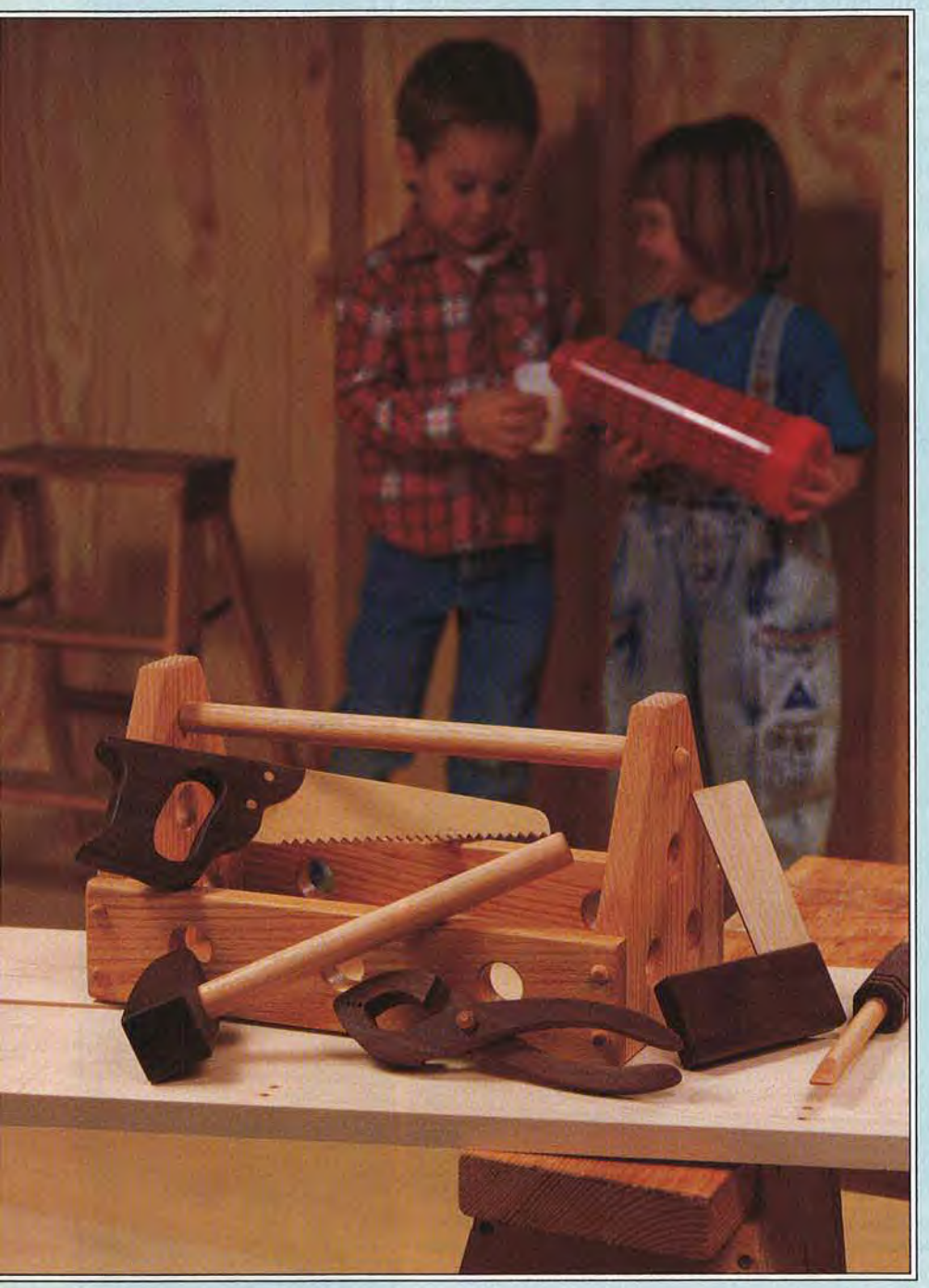
Sensenich's fine-tuned wooden props are lighter than metal ones, and vibrate less, pilots say.



TINY-TYKE TOOLBOX 'N'

Print this article

Most kids can't resist the urge to give Mom and Dad a helping hand. But, too often, children lack the tools to turn an imaginary screw or pound a block of wood. Not any longer! Now you can turn your budding builders loose with our wooden tools and toolbox designed and built just for them.



Let's start with the toolbox

1 To make the toolbox ends (A), cut two pieces of ¾" stock to 6×7¼". Cut the sides (B) to the size listed in the Bill of Materials. With double-faced tape, stick the ends together face-to-face with the edges and ends flush. Then, stick the sides together.

2 Using the dimensions on the Toolbox drawing, mark the hole centerpoints on the top face of the taped-together ends and sides.

3 Drill 1" holes in the ends and sides where marked. Switch bits and drill the 7/16" hole through the ends. Now, with a ¼" bit, drill the holes through the sides.

4 Mark the cutlines on the end pieces. Bandsaw the angled lines.

5 With a wood wedge, pry the pieces apart, and remove the tape.

6 Cut or rout a ⅛" groove ¼" deep ¼" from the bottom inside edge in the side and end pieces. Then, form a ¾" rabbet ¼" deep across the ends of the side pieces.

7 Rout a ⅛" round-over along the end and side pieces where shown on the Toolbox drawing. (We used our table-mounted router to rout the round-overs.)

8 Cut the bottom (C) to size (we used ⅛" birch plywood).

9 Dry-clamp the parts (A, B, C) to check the fit. Glue and clamp the box, checking for square. Later, use the previously drilled ¼" holes in the box sides as guides to drill ¼" holes 9/16" deep into the edges of the ends. Put a drop of glue in each hole and plug the holes with ¼" axle pins.

10 Cut the handle (D) to length from a ¾" dowel. (We left a 1/16" gap between the axle pin head and end pieces so the handle will rotate.) Drill a ⅜" hole ¾" deep centered in each end of the handle. Put a drop of glue in the holes, and pin the handle to the box with ⅜" axle pins. Finish-sand the box and add the finish.

TOOLS

The screwdriver adds to the set

1 To form the handle (J), plane a 1⅛"-wide by 12"-long piece of ¾"-thick walnut stock to 9/16" thick. Crosscut the piece in half. Glue the two pieces face-to-face with the edges and ends flush.

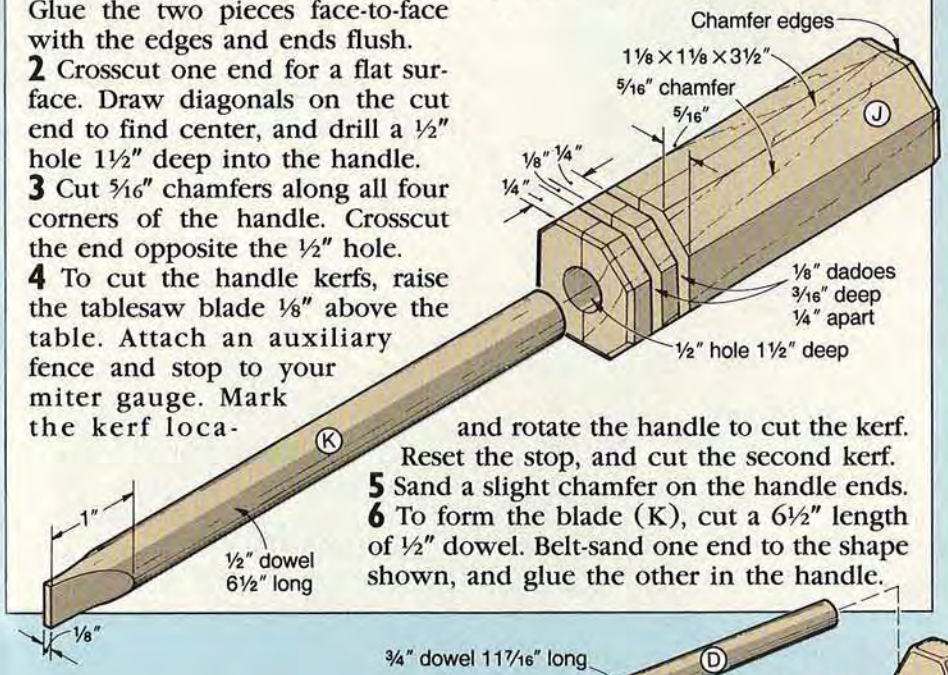
2 Crosscut one end for a flat surface. Draw diagonals on the cut end to find center, and drill a ½" hole 1½" deep into the handle.

3 Cut 5/16" chamfers along all four corners of the handle. Crosscut the end opposite the ½" hole.

4 To cut the handle kerfs, raise the tablesaw blade ⅛" above the table. Attach an auxiliary fence and stop to your miter gauge. Mark the kerf locations on the handle. Place the handle against the auxiliary fence, align the marks with the blade, position the stop, start the saw, and rotate the handle to cut the kerf. Reset the stop, and cut the second kerf.

5 Sand a slight chamfer on the handle ends.

6 To form the blade (K), cut a 6½" length of ½" dowel. Belt-sand one end to the shape shown, and glue the other in the handle.

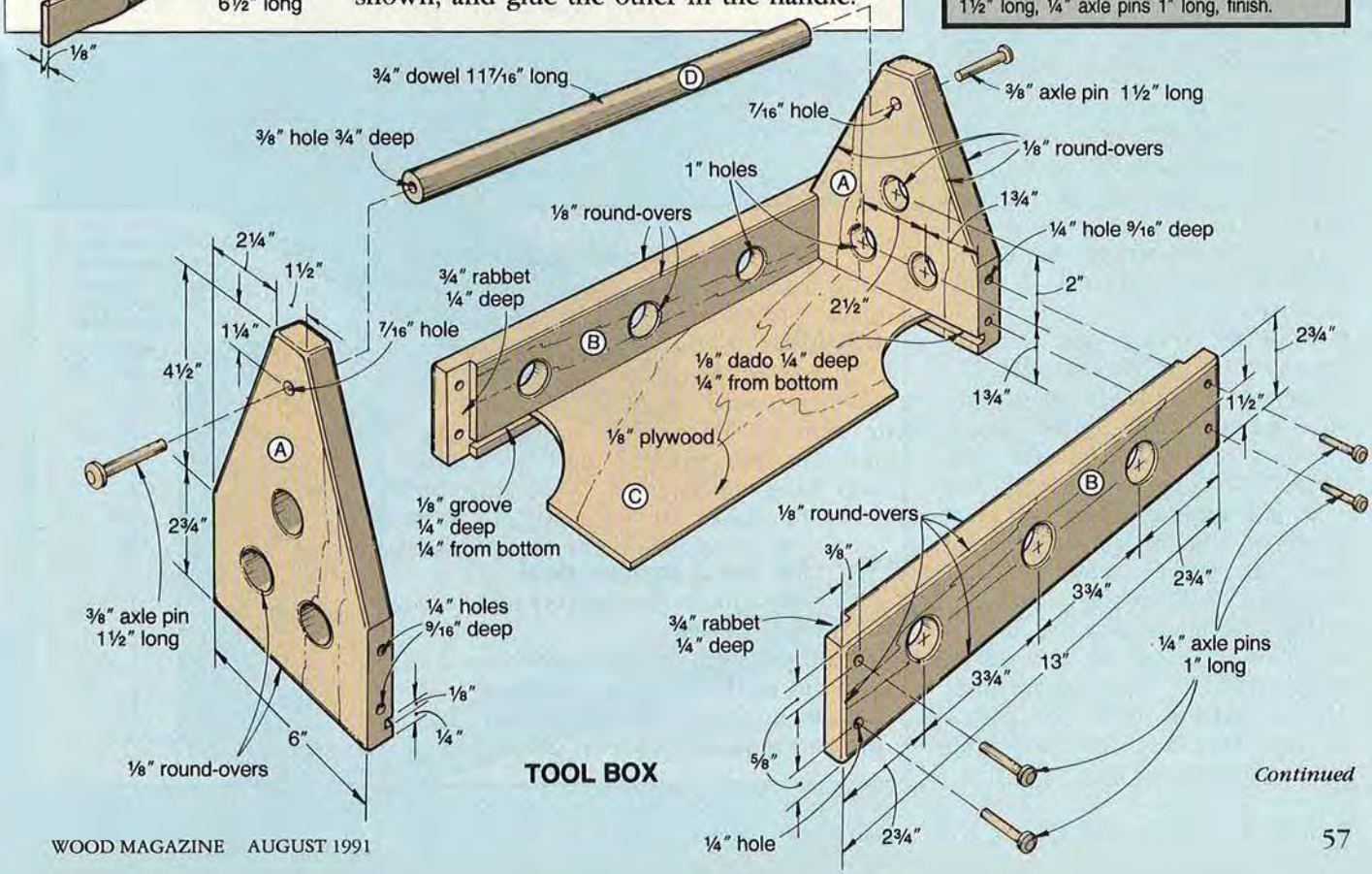


Bill of Materials

Part		Finished Size T	W	L	Matl.	Qty.
TOOLBOX						
A	ends	¾"	6"	7¼"	O	2
B	sides	¾"	2¾"	13"	O	2
C	bottom	⅛"	6"	12"	BP	1
D	handle	¾" dia.		11 7/16"	D	1
SAW						
E	handle	¾"	3½"	6"	W	1
F	blade	⅛"	2"	8½"	BP	1
SQUARE						
G	handle	¾"	1⅞"	4⅛"	W	1
H	blade	⅛"	1½"	6"	BP	1
PLIERS						
I	handle blank	¾"	3"	7¾"	W	1
SCREWDRIVER						
J	handle	1⅛"	1⅛"	3½"	LW	1
K	blade	½" dia.		6½"	D	1
MALLET						
L	head	1½"	1½"	4"	LW	1
M	handle	¾" dia.		9¼"	D	1

Material Key: O-oak, BP-birch plywood, D-dowel stock, W-walnut, LW-laminated walnut.

Supplies: double-faced tape, ⅜" axle pins 1½" long, ¼" axle pins 1" long, finish.



TOOL BOX

Continued

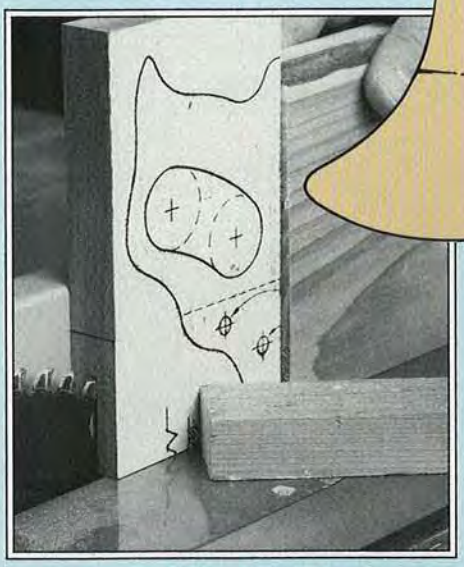
TOOLBOX 'N' TOOLS

Now, saw the saw

1 Cut a piece of ¾" walnut to 3½" wide by 6" long for the handsaw handle (E).

2 Using carbon paper or a photocopy and spray adhesive, transfer the full-sized handsaw handle pattern to the walnut, including the hole centerpoints.

3 As shown in the photo *below*, cut a ⅛" kerf 2" deep in the blade end of the handle.



Use a push block to safely feed the handle blank over the tablesaw blade.

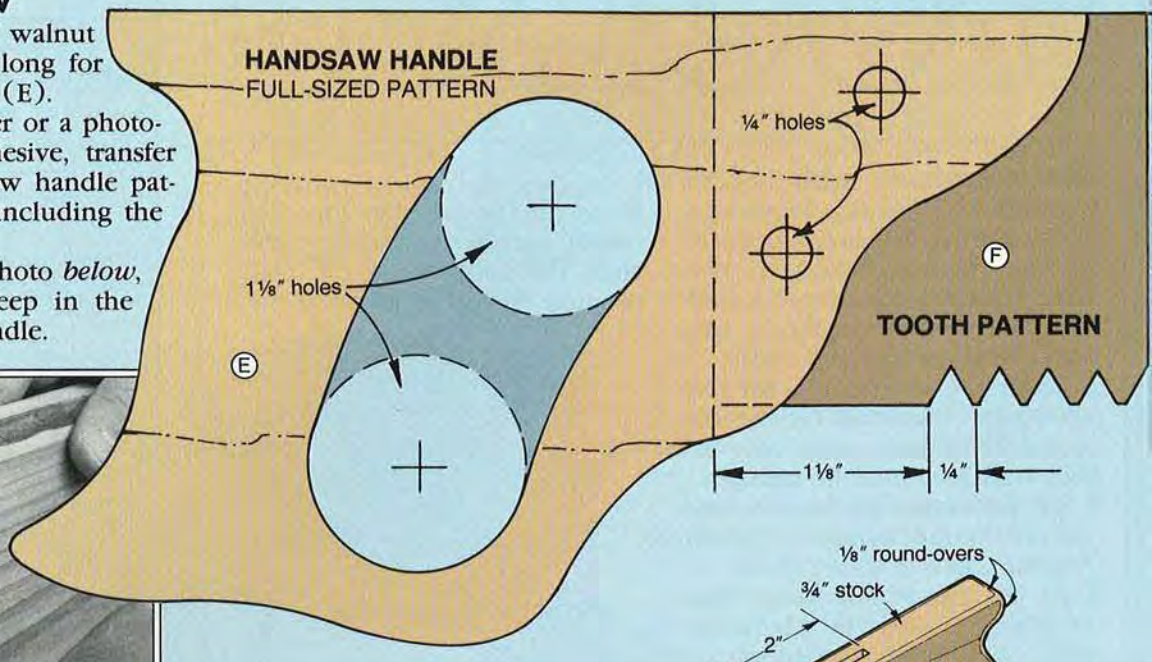
4 Drill the ¼" holes for the pins and 1⅛" holes for the opening.

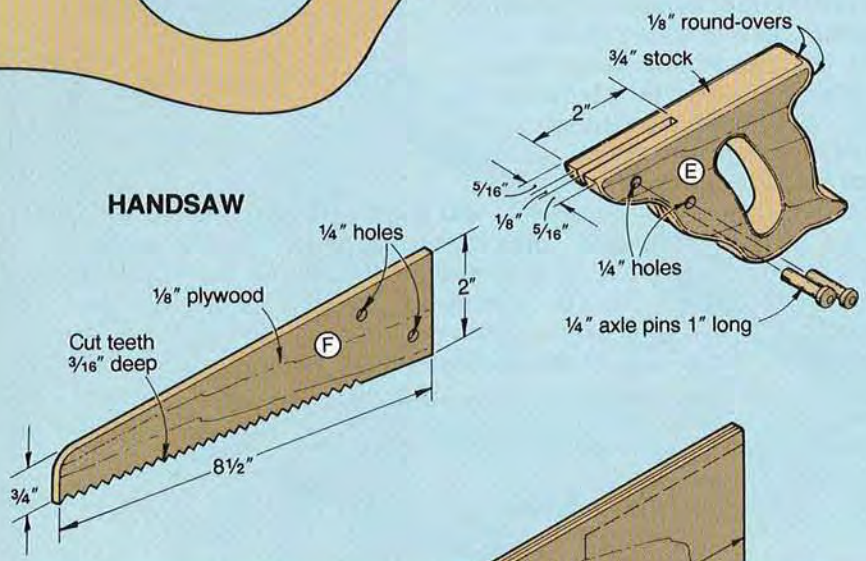
5 With a scrollsaw or coping saw, cut between the two 1⅛" holes to finish forming the opening. Cut the handle to shape. Sand the opening smooth with a 1" sanding drum.

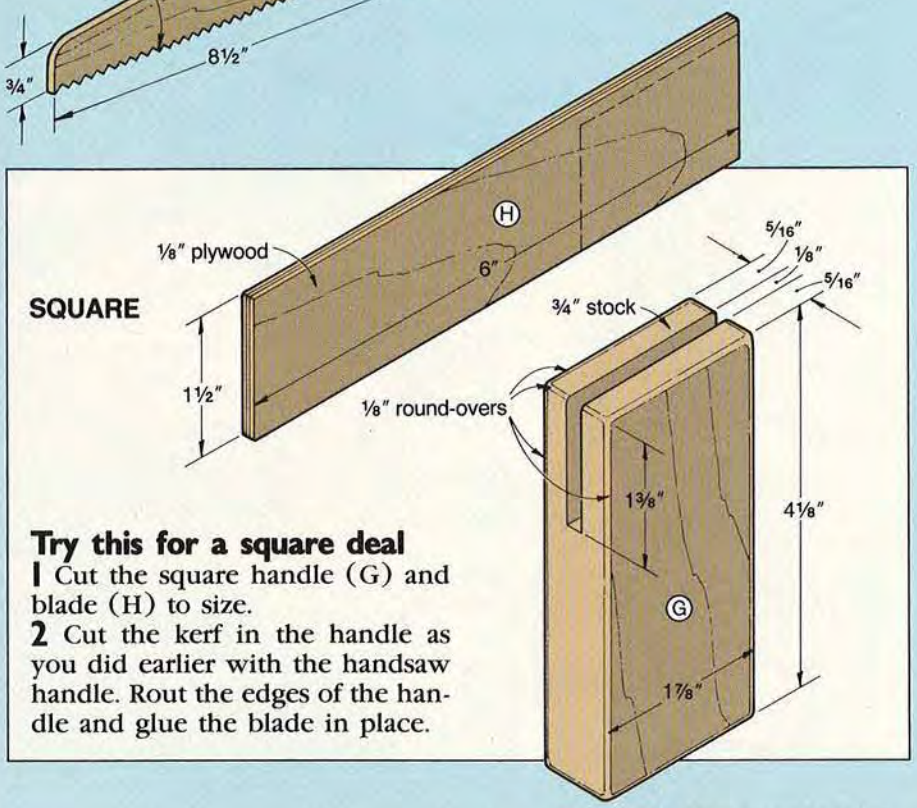
6 Rout ⅛" round-overs on the handle where shown at *right*.

7 Lay out the saw-blade outline on a piece of ⅛×2×8½" birch plywood for part F. Use the full-sized tooth pattern to mark the teeth outline along one edge. Cut the blade and teeth to shape (we used a bandsaw). Sand the teeth smooth to dull the sharp points.

8 Glue the blade into the kerf in the handle. Using the two previously drilled ¼" holes in the handle as guides, drill ¼" holes through the blade. Glue and plug the holes with ¼" axle pins.







Try this for a square deal

1 Cut the square handle (G) and blade (H) to size.

2 Cut the kerf in the handle as you did earlier with the handsaw handle. Rout the edges of the handle and glue the blade in place.

Pliers for play

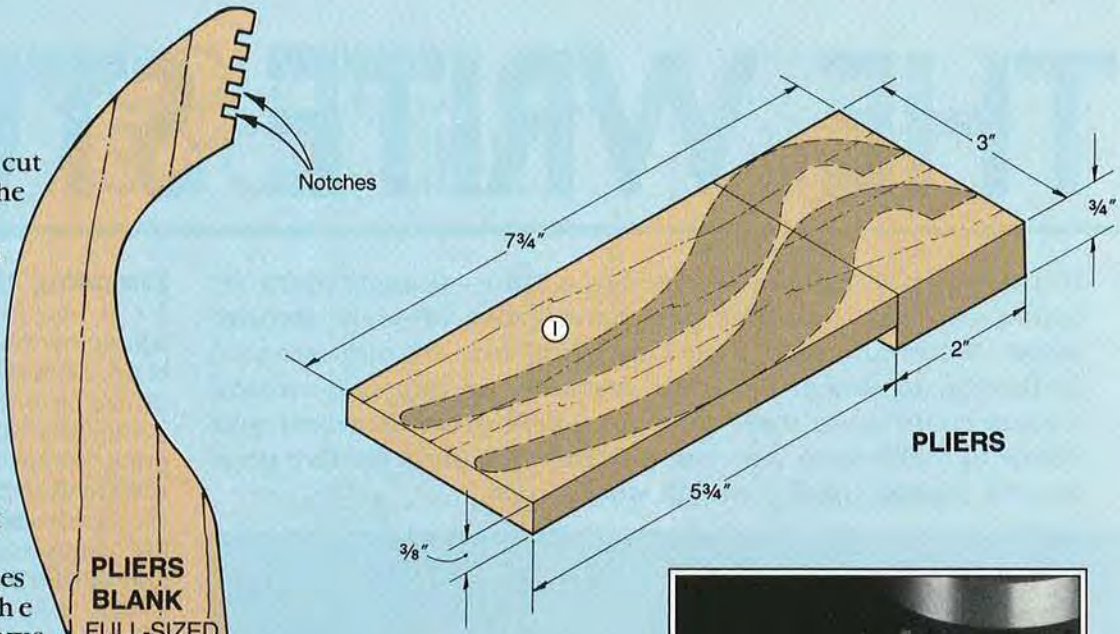
1 From ¾" walnut, cut a piece 3×7¾" for the pliers blank (I).

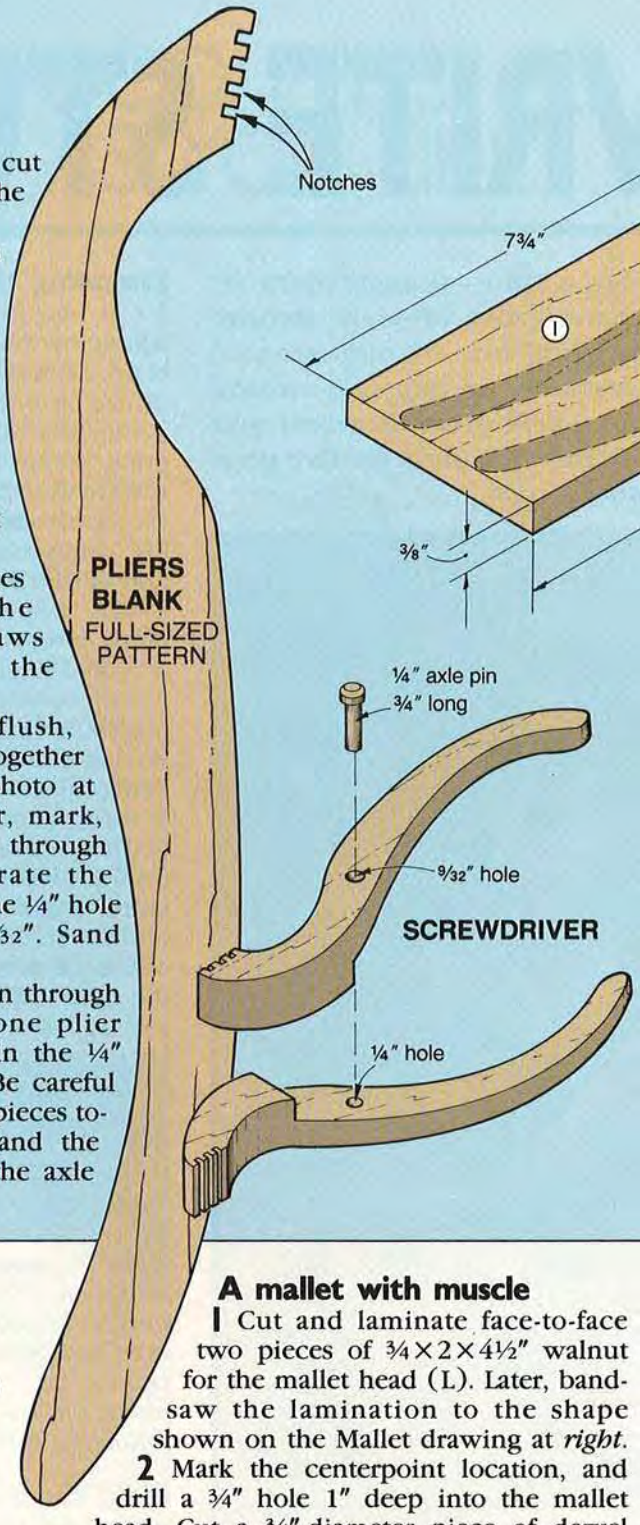
2 Using a radial-arm saw or wide-bladed bandsaw, cut a ⅜" rabbet 5¾" long where shown on the Pliers Blank drawing at *right*. Transfer the full-sized pliers patterns to the walnut stock where shown.

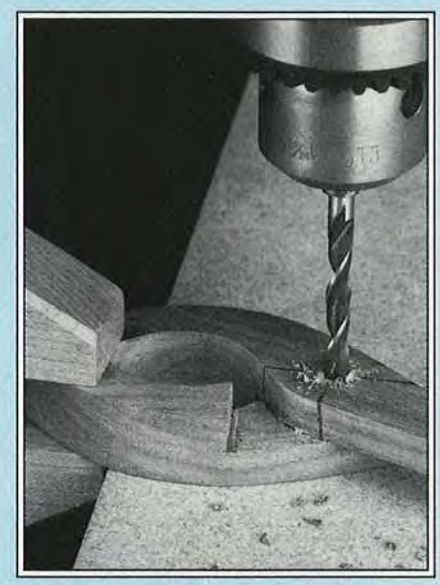
3 Cut the two pieces to shape. Cut the notches in the jaws where shown on the full-sized pattern.

4 With the jaws flush, clamp the pieces together as shown in the photo at *right*. Now, center, mark, and drill a ¼" hole through the pieces. Separate the pieces, and redrill the ¼" hole in one piece to 9/32". Sand both pieces.

5 Slide a ¼" axle pin through the 9/32" hole in one plier piece, and glue it in the ¼" hole in the other. Be careful not to glue the two pieces together. Trim and sand the protruding end of the axle pin flush.







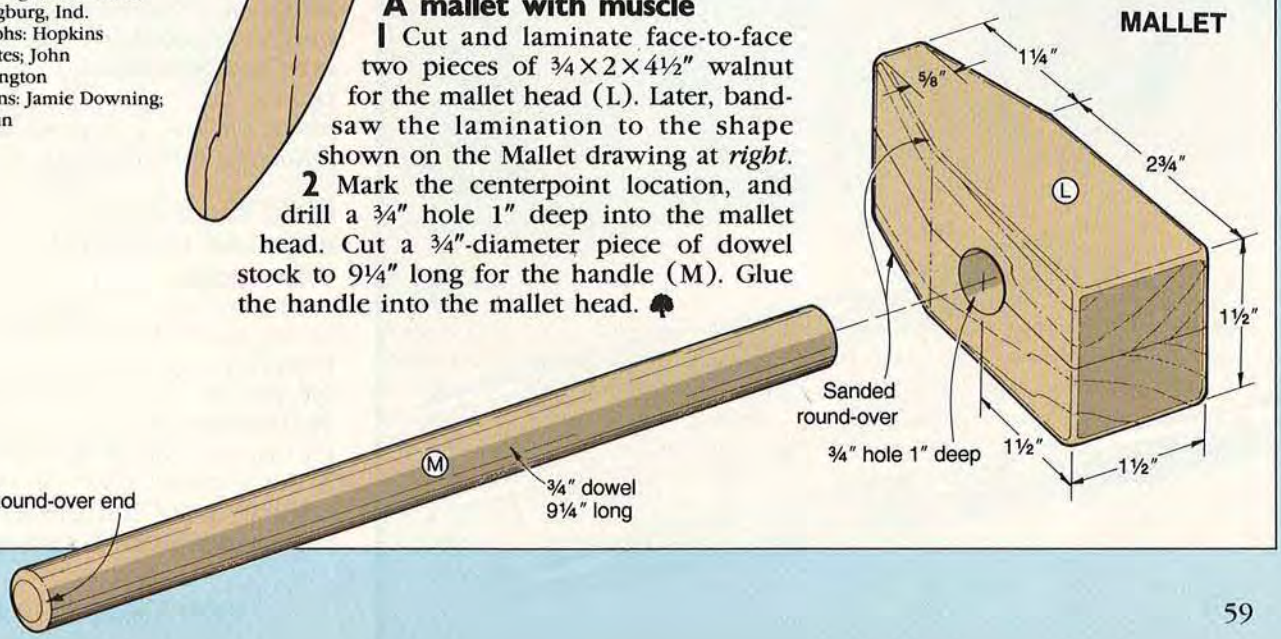
With the notched jaws flush, clamp the plier pieces together, and drill the ¼" pin hole (we used a brad-point bit).

Project Design: Bill Kaiser, Huntingburg, Ind.
Photographs: Hopkins Associates; John Hetherington
Illustrations: Jamie Downing; Bill Zaun

A mallet with muscle

1 Cut and laminate face-to-face two pieces of ¾×2×4½" walnut for the mallet head (L). Later, bandsaw the lamination to the shape shown on the Mallet drawing at *right*.

2 Mark the centerpoint location, and drill a ¾" hole 1" deep into the mallet head. Cut a ¾"-diameter piece of dowel stock to 9¼" long for the handle (M). Glue the handle into the mallet head.



THE WRITE STUFF

You don't have to own or operate a lathe—though that's an option—to turn beautiful pen barrels out of your favorite wood. We challenged Kim Downing, one of our talented draftsmen, to design an arbor assembly so our non-turning readers could make these pens on a drill press. However you decide to make them, you can purchase the parts for five pens for $15, postage paid. Just add wood.

Preparing the pen barrels

1 Cut two pieces of stock to ⅝" square by 2⅛" long for the barrel blanks. Draw diagonals to find the center on one end of each blank.

2 Chuck a 9⁄32" bit into your drill press. Secure the barrel blank in a handscrew clamp, and check that the blank and bit are square with the drill-press table. Drill a 9⁄32" hole through the length of the blank. Repeat with the other piece of stock.

3 With 150-grit sandpaper, rough-up the outside surface of two pieces of the brass tube (see the Buying Guide for our source) for better adhesion in the next step.

4 Using gap-filling cyanoacrylate (instant) glue or 5-minute epoxy, coat the walls of the hole in each barrel blank. Push the brass tube into the stock, rotating the tube to distribute the adhesive. Repeat for the other barrel blank. If you get any adhesive in the brass tubes, let it cure, and then use the all-thread rod from the arbor assembly as a file to remove it.

5 Sand a 3⁄16" chamfer along each corner of each blank (see the End View detail for reference.)

***Note:** To turn the pen barrels to shape on a lathe, you'll need to use the mandrel listed in the Buying Guide and shown in the drawing at* far right. *To shape the pieces on the drill press, use the following instructions.*

Build the arbor, and sand the barrels

1 Cut a piece of ¼"-diameter all-thread rod to 6¼" long. Fasten a barrel blank between the guide bushings and nuts where shown on the Arbor Setup drawing. Tighten the nuts to secure the barrel blank to the all-thread rod.

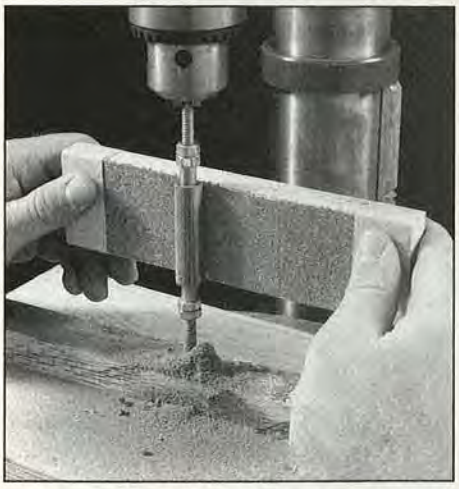
2 Cut a piece of ½"- or ¾"-thick stock 2" wide and the length of your drill-press table for the guide

HARDWOOD PENS, AS EXOTIC AS YOU LIKE

block. Drill a ¼" hole in the middle of the guide block.

3 Place the guide block on the drill-press table. Place one end of the arbor assembly in the ¼" hole in the guide block, and fasten the opposite end in the drill-press chuck where shown in the Arbor Setup drawing. Clamp the guide block to the table.

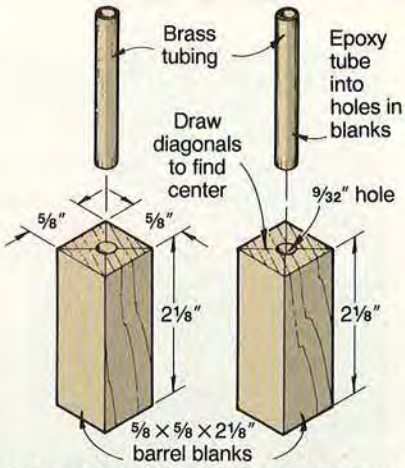
4 With a rasp, coarse file, or 60-grit sandpaper wrapped around a piece of wood 2" wide, round the barrel to a diameter *just slightly larger than the bushings* as shown in the photo *below*. (We used a speed of about 1450 rpm.) *Be careful not to reduce the thickness of the guide bushings.* Using progressively finer grits of sandpaper, finish-sand the pen barrel flush with the outside surface of the bushings. Stop the drill press and do the final sanding with the grain. Repeat the procedure for the other pen barrel.



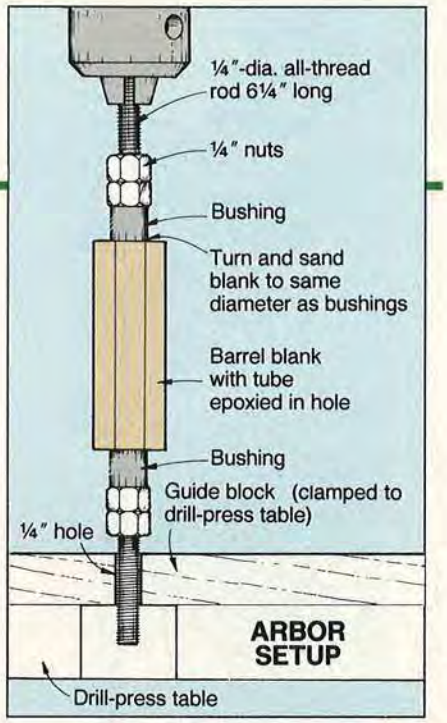
With the drill on, hand-sand the pen barrel blank flush with the outside surface of the guide bushings.

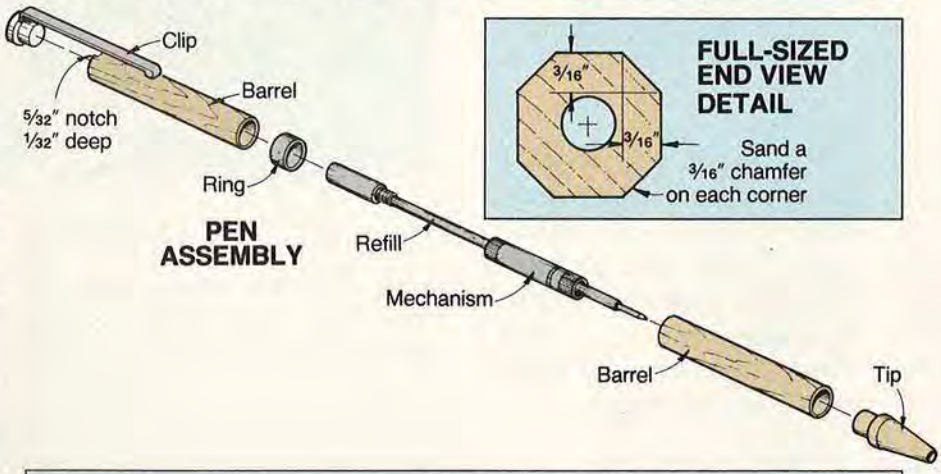
5 Carefully file a 1/32"-deep notch in the top end of the top barrel as wide as the clip.

6 Add the finish to each barrel. Assemble the pieces as shown on the Pen Assembly drawing.

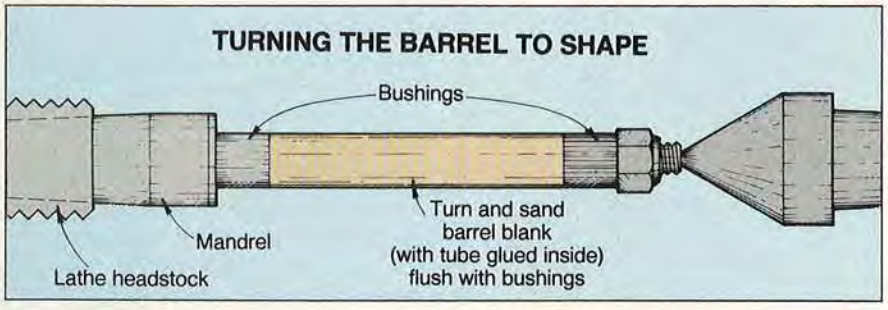


PREPARING THE PEN BARRELS





PEN ASSEMBLY


TURNING THE BARREL TO SHAPE
Bushings
Turn and sand barrel blank (with tube glued inside) flush with bushings
Mandrel
Lathe headstock

Buying Guide

● **Pen kit.** Two guide bushings plus enough parts (not including wood) for five pens, catalog no. IB500, $15 ppd. Craft Supplies, 1287 E. 1120 S., Provo, UT 84601, or call 801/373-0917 to order.

● **Pen-turning mandrel and bit.** Mandrel with a #2 Morse taper, 7mm brad-point drill bit, and set of turning instructions, catalog no. GM050, $19.95 ppd. Craft Supplies, address at *left*.

Photographs: Hopkins Associates Illustrations: Kim Downing; Bill Zaun

WILY-FOX WEATHER VANE

This quick red(wood) fox is more than a pretty cutout. Scroll- or bandsaw it with our pattern, then complete the simple weather-vane plan, and turn the fox out to keep watch on the wind.

Print this article

He goes where the wind blows

Enlarge the Fox pattern, *opposite page,* with an enlarging copier or gridded paper, and transfer it to a ¾ × 8 × 24″ piece of redwood. Align the feet of the fox with one edge of the board. (We applied a photocopy enlargement to the wood with spray adhesive, but a carbon-paper tracing also works.)

Cut the outline with a scrollsaw (we used a #11 skip-tooth blade), and then drill a 3⁄32″ start hole where indicated on the pattern. Thread the blade through the hole to make the interior cut between the tail and hind leg. If you are cutting the fox with a bandsaw, notice the optional entry cut marked on the pattern.

Mark the location for the pivot-tube hole on the bottom edge of the fox, where shown on the pattern. The hole must be straight and vertical, so we used a doweling jig as a drill guide. Install the jig loosely, put a dowel into the drill hole, and adjust the jig so that the dowel is aligned with the reference line on the plan. Then, tighten the jig, remove the dowel, and drill the hole 3¾″ deep with a 5⁄16″ brad-point bit.

Next, select a piece of 1½ × 1½″ stock (we used redwood) of appropriate length for your mounting post. Center and drill a ¼″ hole 2″ deep and then cut ½″ chamfers at one end.

Hacksaw ½″ from one end of a brass toilet-tank float rod, available from a home center or hardware store. Coat the short piece with epoxy and insert it into one end of a 3¾″-long piece of ¼″ copper tube. Now, cut the float rod to 10″ overall, leaving the long threads on the uncut end. With a grinder or disc sander, grind the cut end to a point. (See the Post detail *opposite page.*)

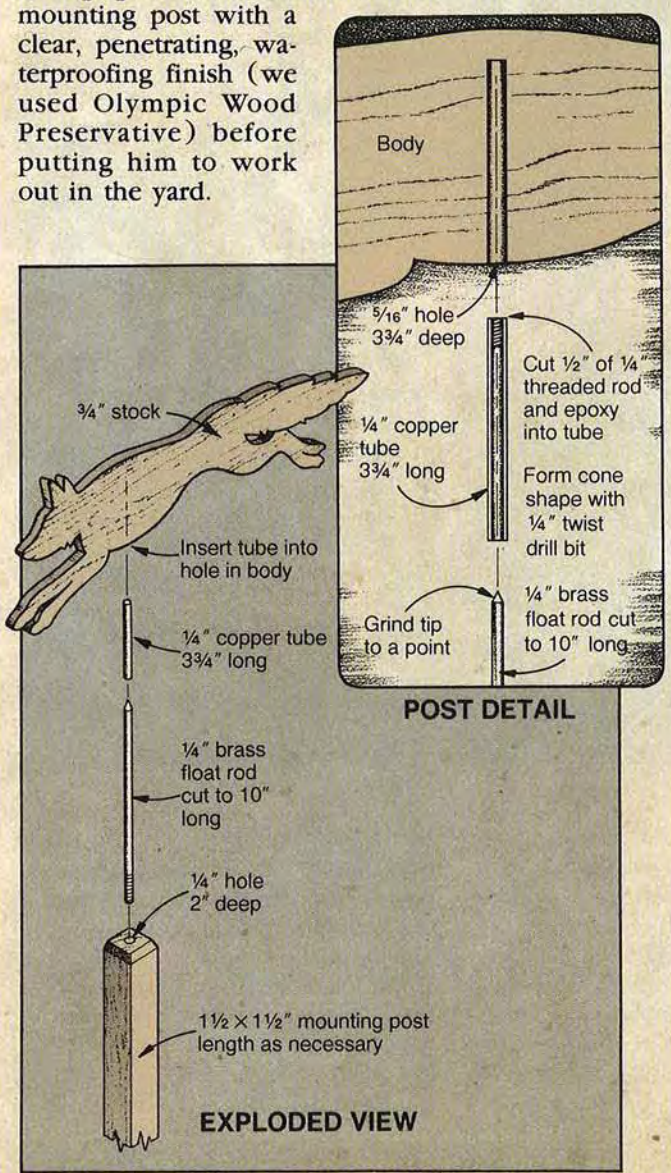
Design: Desiree Hajny Photograph: John Hetherington Illustrations: Jamie Downing; Jim Stevenson

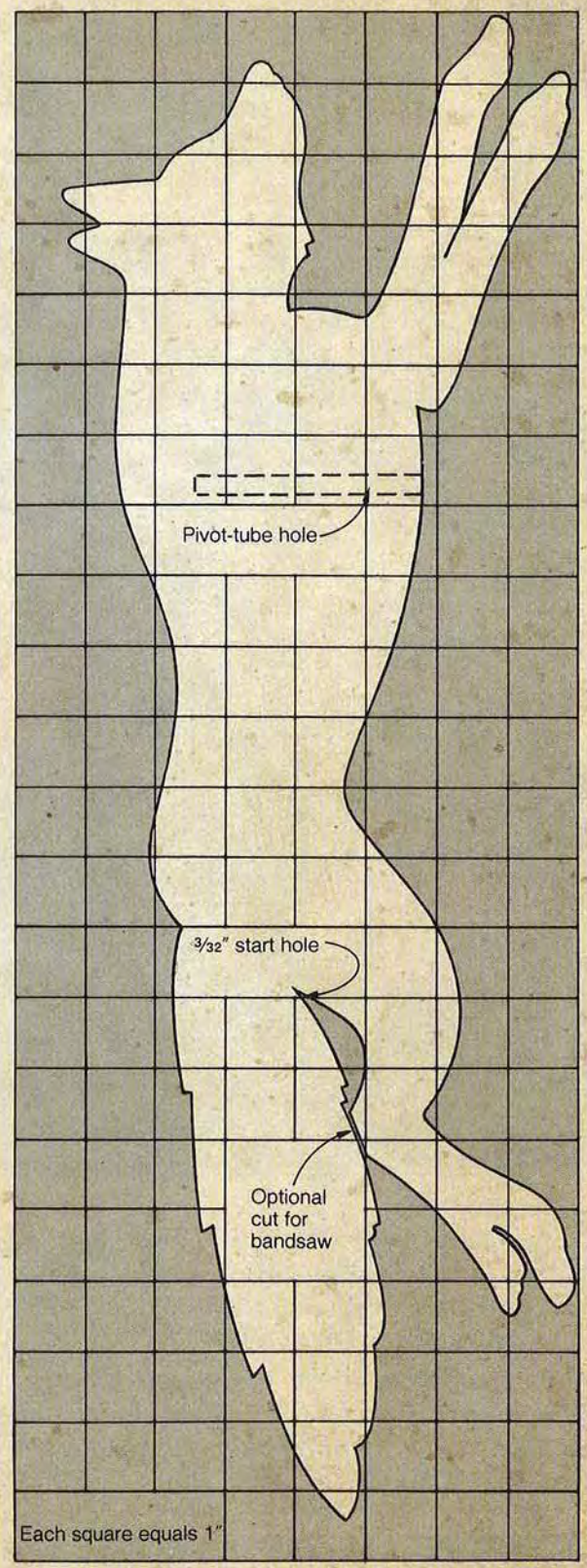
Coat the threaded end of the float rod with epoxy and then insert it into the hole at the top of the mounting post.

Sand the outside of the copper tube with 60-grit sandpaper, coat it with epoxy, and press it into the hole in the fox. Insert the closed end first. Drill into the brass piece inside the tube with a ¼" twist bit to form a cone.

Sand the fox and post, and round over the edges slightly with sandpaper. Coat the fox and mounting post with a clear, penetrating, waterproofing finish (we used Olympic Wood Preservative) before putting him to work out in the yard.

To enlarge this pattern on a photocopying machine, set the copier's enlargement ratio at 141 percent. Copy the pattern, then enlarge the copy at 141 percent. Enlarge the resulting copy again; this time in sections at 121 percent. Join the pieces with cellophane tape for a full pattern.


Body
5/16" hole 3¾" deep
Cut ½" of ¼" threaded rod and epoxy into tube
¼" copper tube 3¾" long
Form cone shape with ¼" twist drill bit
¼" brass float rod cut to 10" long
Grind tip to a point
POST DETAIL
¾" stock
Insert tube into hole in body
¼" copper tube 3¾" long
¼" brass float rod cut to 10" long
¼" hole 2" deep
1½ × 1½" mounting post length as necessary
EXPLODED VIEW



It's little, but loaded with charm

COUNTRY WAGON

In any wagon race, this one wins by a country mile. Functional features and an old-time farm-wagon look are reasons enough to make this charmer. Build it as a toy or a country decoration. Either way, you'll build it fast with our easy-to-follow plan.

Print this article

Note: *We made the wagon sides with ⅜"-thick pine, resawed from ¾" stock. You could plane thicker stock to size, too.*

Cut parts A, B, C, D, and E to the sizes listed in the Bill of Materials. Miter-cut the wagon-box ends and sides (B, C). Then, cut a 4½" length of 1×6" stock. Trace the full-sized patterns, *opposite page,* for parts F and G onto the 1×6 with carbon paper, and cut them out with a scrollsaw or bandsaw.

Cut a 6¾" length of ⅜" dowel for the handle, a 2¼" length of ¼" dowel for the hinge pin, and a 1½" length of ⅛" dowel for the handle pull.

Drill axle holes in parts F and G and the pivot hole in part G where shown on the patterns. Refer to the Exploded-View drawing, and drill the 11/32" hole in the center of the front-axle spacer (D). Bore the holes with a drill press and brad-point bits.

Clamp the handle block (E) into the slot of the front axle support (F), and drill the ¼" hinge-pin hole through both pieces where shown on the pattern. Change to a ⅜" bit, and drill the hole for the handle centered on one end of part E.

Drill a ⅛" hole ¾" from one end of the handle, and glue the ⅛" dowel handle pull into it. Glue the handle into the ⅜" hole in part E, aligning it so the pull is parallel to the hinge-pin hole.

Glue and nail box sides (B, C) to the bottom (A) with ⅝" × #17 brads. Glue the front-axle spacer (D) and rear-axle support (G) into place where shown on the Exploded-View drawing. Power-sand a radius where shown on part E, and hand-sand a round-over along the edges of part F.

Paint your wagon before final assembly. As you assemble the wagon, place plastic or metal washers where shown. Be sure to avoid getting glue where it might prevent the wheels, the front-axle support, or the handle hinge from moving freely.

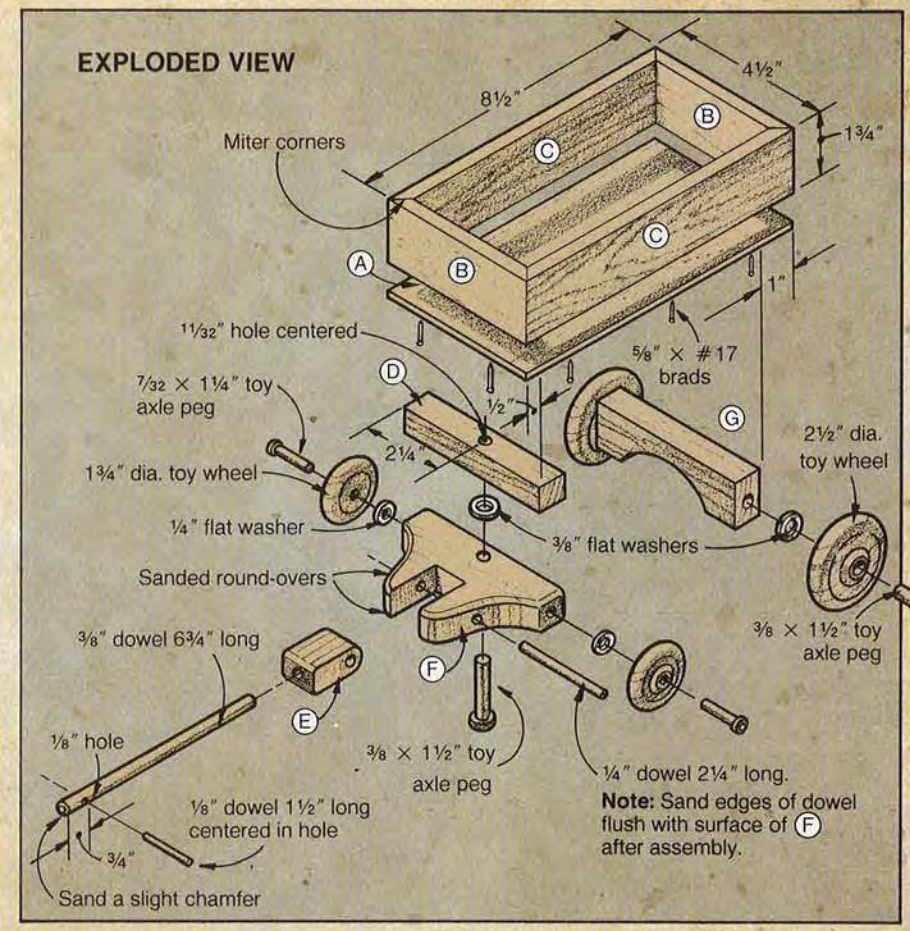
Buying Guide

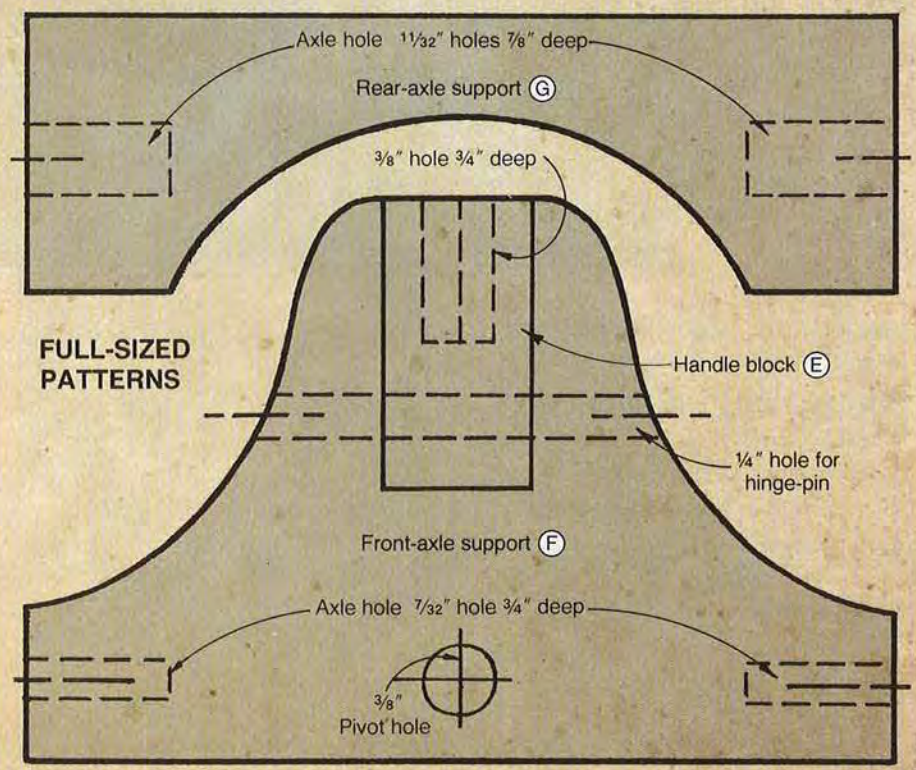
● ***Wheels and axles.*** Full set for country wagon project, catalog no. 9627, $6.45 for one kit, $9.95 for two, ppd. Meisel Hardware Specialties, P.O. Box 70-W8, Mound, MN 55364.

Bill of Materials

Part		Finished Size T	W	L	Matl.	Qty.
A	bottom	⅛"	4½"	8½"	PL	1
B	ends	⅜"	1¾"	4½"	PN	2
C	sides	⅜"	1¾"	8½"	PN	2
D	F. axle spacer	¾"	¾"	4½"	PN	1
E	handle block	¾"	¾"	1½"	PN	1
F	F. axle support	¾"	2⅞"	4½"	PN	1
G	R. axle support	¾"	1⅜"	4½"	PN	1

Material key: PL = plywood, PN = pine





Photograph: John Hetherington Illustrations: Jamie Downing; Jim Stevenson

RESPLENDENT

More than just jewelry, our tasteful timepiece not only tells the hour and minute of the day, but it also shows the date and phases of the moon. A cinch to make, the pendant will remind the lucky recipient of both your affection and your woodworking skills.

Print this article

Plane or resaw a piece of stock (we used maple), that measures at least 2¼" wide by 12" long to ½" thick. (We used a 12"-long piece for safety when machining.)

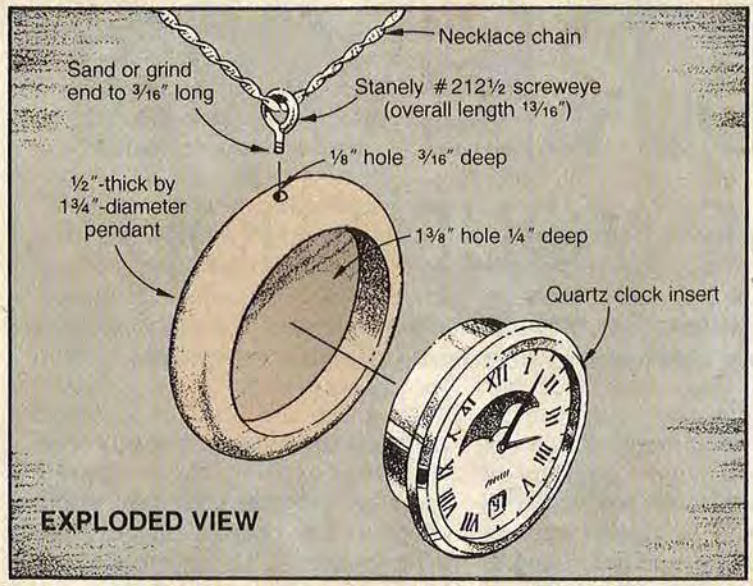
Mark a centerpoint 2" from one end of the stock. With a compass, mark a 1¾"-diameter circle (⅞" radius) locating the compass point on the centerpoint. Chuck a 1⅜" Forstner bit into your drill press. Center the bit directly over the marked centerpoint and clamp the stock to your drill-press table. Drill a ¼"-deep hole.

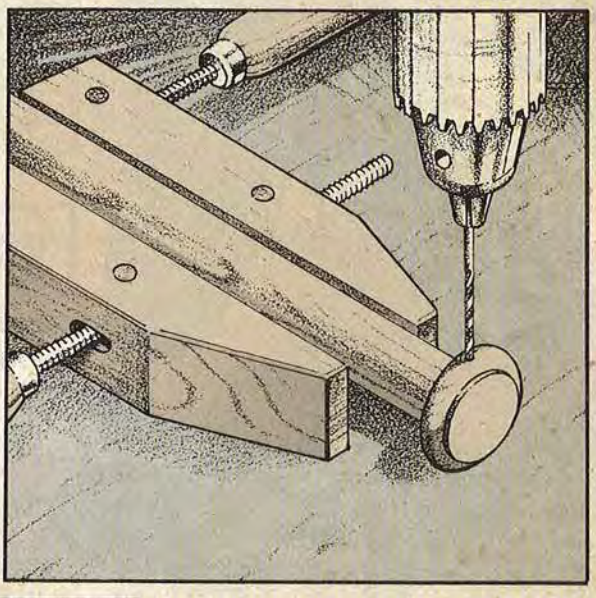
With a bandsaw or scrollsaw, cut just outside the marked line and then sand to the line (we used our disc sander). Cut a piece of 1"-diameter dowel to 12" long. Using hotmelt adhesive, adhere one end of the dowel to the back of the pendant. Fit your table-mounted router with a 3/16" round-over bit and a fence. As shown in the drawing at *right*, rout a 3/16" round-over along the front edge of the pendant.

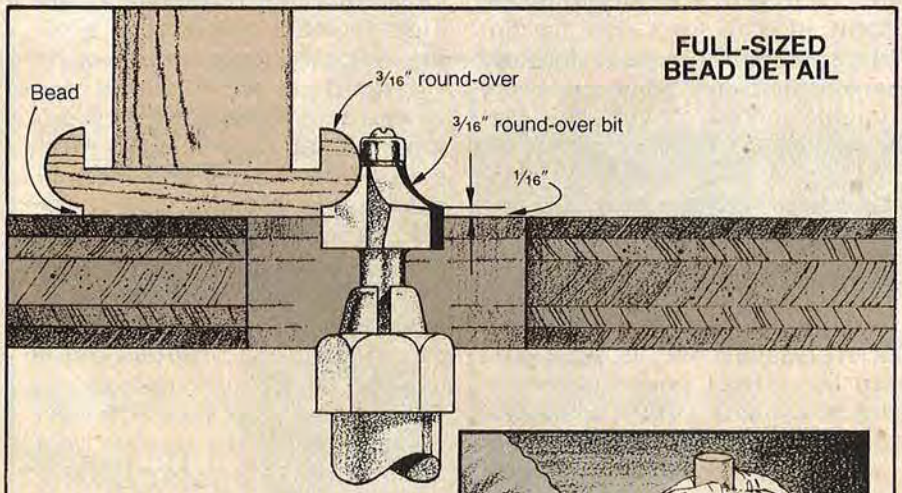
Remove the dowel from the back of the pendant, and use a

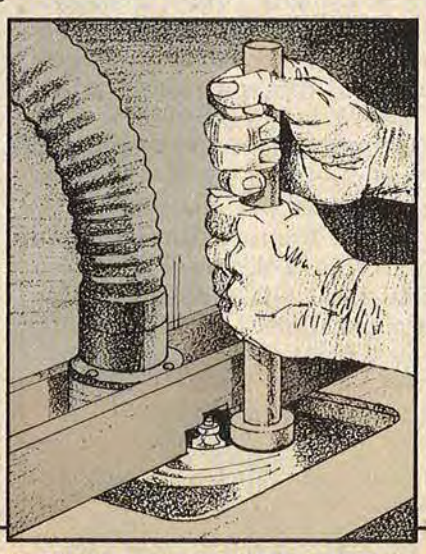
PENDANT

A timely gift that's fun to make and give


Necklace chain
Sand or grind end to 3/16" long
Stanely #212½ screweye (overall length 13/16")
1/8" hole 3/16" deep
½"-thick by 1¾"-diameter pendant
1⅜" hole ¼" deep
Quartz clock insert
EXPLODED VIEW







For better control and to keep your fingers safely away from the bit when routing such a small piece, adhere a dowel to the pendant blank.

chisel to scrape off the hotmelt adhesive. Adhere one end of the dowel in the pendant hole. Using the same bit, rout a bead on the back of the pendant to the size shown on the Bead detail at *left*.

With the pendant still attached to the dowel, drill a ⅛" hole 3/16" deep into the pendant where shown in the drawing *above*.

Separate the pendant and dowel, and scrape off the hotmelt. Hand-sand the pendant smooth. Grind the threaded end of a Stanley #212½ brass screw eye to 3/16" long. Rub the brass with 0000 steel wool to polish the finish. Epoxy the end of the screw eye into the ⅛" hole in the pendant. Add the finish to the pendant. Loop a necklace (we used a 24" gold French rope) through the screw eye. Slide the friction-fit clock insert into position.

Buying Guide

- **Mini-quartz clock insert.** Shows date, time, and moon phase, product no. 15063N, $19.95 ppd. Klockit, P.O. Box 636, Lake Geneva, WI 53147. Or, call 800-556-2548 to order.

Project Design: Jim Boelling Photograph: John Hetherington Illustrations: Jamie Downing; Jim Stevenson

HOME BREWS for your shop

With a little effort, you can concoct some friendly, nonpolluting mixtures to perform a number of chores.

Thanks to *WOOD*® magazine reader Ken Ozimek of Nashville, Tennessee, for asking us about nontoxic replacements for woodshop supplies. We did a little research and experimentation, with some surprising results.

Paint you can make

Toxic chemicals and carcinogens abound in paints, especially those petroleum based. To stem possible pollution, most landfills won't accept paint cans—you have to take empties (even latex-based) to a hazardous-waste disposal site. But you do have an option.

Milk paint was a popular and safe colorant a century ago, and it's still an easy-to-make, inexpensive alternative. To get the old-time look on some of your woodworking projects, try this formula: Mix enough hot water with instant, nonfat dry milk to form a smooth syrup. Add small amounts of powdered tempera color (available at art supply and paint stores) to get the shade you want. Apply in coats for a rich, flat finish. Although milk paint does dry slower than store-bought, it's very durable and has an authentic Early American look.

Need to remove paint?

If you don't mind mixing and a slower pace, we discovered an inexpensive, odorless, and nontoxic formula for paint remover that's nearly as effective as what you can buy. Mix 1 pound of trisodium phosphate (TSP), a natural cleansing powder derived from minerals that you can obtain at paint and hardware stores, into 1 gallon of hot water. (Be sure to wear rubber gloves; TSP can irritate your skin.) Then, brush on the mixture and let it sit for 30 minutes. Remove the softened paint with a scraper. Of course, multicoats of paint require repeated applications.

Two surefire ways to soften brushes

Here again, you can turn to trisodium phosphate. Add 4 ounces of TSP to 1 quart of hot water. Work the solution into the bristles by pressing them against the bottom of the container, then separate them as the paint softens. When all paint has been removed, rinse with water. This process takes longer than with the traditional high-powered commercial product, but it's a lot more pleasant.

Over time, we've found that vinegar rates a place in everyone's shop. It not only removes fresh epoxy from fingers and material, and loosens old glue, but it also softens paint (even tough milk paint). To clean brushes, pour enough distilled white vinegar (5 percent acid) into an old saucepan to cover the bristles. Bring it to a boil on the stove, then reduce the heat and let it simmer for five minutes. When the brushes cool, wash them in soap and water, then rinse thoroughly.

Citrus to the rescue

Take the old household hint about removing stains with lemon juice a step further. Believe it or not, you can clean and shine metals with a plain lemon. For brass, use straight lemon juice (fresh or reconstituted). Copper cleans better when you add a few sprinkles of salt to the juice. In both instances, rinse the juice off the metal with water after cleaning. Don't use lemon juice on silver or gold; it can stain.

Illustration: Jim Stevenson

See "Milk paint needs more punch" in the April 1992 issue (no. 51). Click here to view.
Print this article

FIVE TIPS ON BUYING CARVING TOOLS

Print this article

While interviewing the experts for the carving-tool article you'll find on page 42, we discovered several recurring themes. Keep these pointers in mind. They can save you time and money.

•Buy from a reputable source with a return policy

You can mail-order carving tools from many sources, and we've listed a few on page 47. Why is a return policy important? It's not unusual to order a tool through the mail, only to find out that it's not what you had in mind.

•Buy individual tools rather than sets

You can save a buck or two by buying carving tools in sets, but you usually wind up with a few tools you rarely will use. Buy your tools one at a time, as you need them, and you'll come out dollars ahead in the long run.

•Try tools before buying

If you can sample a carving tool at a store, carving competition, friend's shop, or woodworking show, do it. You'll never know if the tool feels right and cuts as needed until you put the instrument in your hand.

•Check for hairline cracks in the steel

The forging process creates stresses in steel that can lead to tiny cracks, especially near cutting edges. If you spot any cracks—no matter how small—return the tool to the seller immediately.

•Most carving tools do not come presharpened

A few brands, such as Swiss-made and Hirsch/Two Cherries, come presharpened from the factory. But, most brands have factory-ground edges that require honing before you can use them.

Illustration: Jim Stevenson

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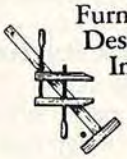

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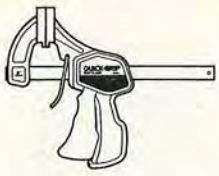

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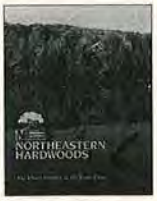

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ASK WOOD

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Double-duty tape

Quite often in some plans where you need to make duplicate parts, it says, "use double-sided tape to hold pieces of wood together when cutting out identical parts." What is double-sided tape and where can it be purchased? Also, what are some of the "brands"?

—Hugh Creveling, Dunedin, Fla.

Hugh, what you call double-sided tape, we call double-faced tape. As you suggest, it works well for adhering several pieces of wood for gang-cutting and sanding operations, as well as applying patterns. The 3M company makes several kinds, offering degrees of tackiness. (We like no. 404 tape for patterns, and their no. 410 tapes for temporarily bonding wooden parts.) Manco, Inc. also makes this tape. You can buy it at hardware stores and homecenters.

The dirt on dust collectors

A big warning sign on the side of the fiberboard drum of my Delta dust collector says, "DO NOT COLLECT OR STORE SPONTANEOUSLY COMBUSTIBLE MATERIALS IN DRUM." My question is this: what types of outputs from saws, planers, jointers, and sanders are "spontaneously combustible"? I would hate to think that I must empty the drum each night. Mine is a home shop where I spend most of my time (I'm retired). Having to empty the drum each night is a messy and aggravating chore. Rarely do my daily operations gather more than an inch in the drum's bottom.

—Bill Ledgerwood, Hot Springs Village, Ark.

Bill, we've done some checking in your behalf and hope our answers prove satisfactory. We spoke with Mark Strahler, the marketing director at Delta. He says that the warning on the dust collector aims at those who might wrongly consider "storing such things as oily rags in the drum or a mixture of metal and wood." According to Mark, "if you use your dust collector for sawdust alone, you should have no trouble whatsoever. Nor do you need to empty it every night." Mark also told us about a video that Delta plans to release on their dust collectors. As you might expect, it contains information on safe and proper use. Call Delta at 800-438-2486 for more on this product. They will be more than happy to help.

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YESTERDAY'S TOOLS

THE STANLEY NO. 77 DOWEL AND ROD TURNER

A REVOLUTION IN DOWEL MAKING

Some craftsmen still use the Stanley No. 77 dowel and rod turning machine, pictured here with three extra cutter heads.

Prior to the development of the Stanley benchtop dowel and rod turning machine, craftsmen cut wood to the approximate size needed. Then they pounded the rough, oversized stock through the tapered, circular hole in a metal dowel-sizing plate. The resulting dowel proved that you really can fit a square peg into a round hole—if you use a big enough hammer. This crude method worked well enough for short joinery dowels, but rods had to be turned on a lathe.

Manufactured by the Stanley Rule & Level Co. from 1911 to 1969, the No. 77 dowel and rod turning machine represented the most important improvement in dowel making since Medieval times. It not only made rods of any length, but also of whatever wood the craftsman needed. The cutter heads themselves are similar to the Scottish wooden rounder, which dates back to the 18th century.

Written with Phillip J. Whitby

Cranking up the eggbeater

Stanley introduced its eggbeater-type mechanism in 1911, adapting it for use with both the dowel machine and several breast drills. On the dowel maker, the metal gear-driven cutter head rotates around the stock, shaving it to a cylinder much as a pencil sharpener shaves wood to a point.

Cast iron and 15" long, the earlier dowel machines were coated with a hard black varnish (*japanned*). Later models were blue.

The dowel machine came standard with a ⅜" dowel cutter, but eight other sizes, ranging from ¼" to ¾", were available in 1/16" increments at additional cost.

In 1911, the machine sold for $8.50, with the other cutter heads selling for 80 cents each. Today, collectors pay between $200 and $400 for one with the standard cutter, more for one with multiple cutter heads. The heads alone range in value from $30 to $100.

Photograph: Tim Murphy

Print this article

GLOW

LITTLE GLOW WOOD

Only ordinary on the outside, sumac has wood of remarkable color and figure.

Mostly shrub-sized, but occasionally growing to a respectable 35′ tall, the common North American sumac has a remarkable family history. For centuries, the Japanese have extracted the sap from an Oriental variety to make a porcelainlike lacquer. And, we can thank a South American sumac cousin for providing the world's nibblers with delicious cashew nuts.

In America, though, the sumac never got much respect, only producing twigs that the early settlers hollowed out for stems on their corncob pipes. Even today, most woodworkers dismiss sumac as small and insignificant. However, those who *know* the wood marvel at its novel qualities.

Yes, the lowly sumac, only recognized for its bright autumn colors, creates a most intriguingly beautiful wood. Alternating green and gold annual rings create an astonishing hue.

Figure also makes sumac stand apart. Quarter-sawed, the stock resembles zebrawood. Flat-sawed, it has a swirling, eddylike character.

Carvers take advantage of sumac's distinctive grain to produce projects with the look of multilayered laminations. As a bonus, they've learned that the wood even can be carved green, with little worry about checking (cracking or splitting) during seasoning. And, under black light, their carvings take on new character as the luminous wood glows with almost supernatural brilliance in shades of lavender, yellow, chartreuse, and pale blue!

Illustration: Jim Stevenson

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40-150	15" Hobby Scroll Saw	178	135
28-150	10" Hobby Band Saw	189	144
31-050	1" Belt sander 2.0 amp	93	75
31-460	4" Belt/Disc Sander	178	135
31-340	NEW 1" Belt/8" Disc Sander	226	184
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23-580	5" Bench Grinder 1/5 HP	60	54
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11-090	32" Radial Bench Drill Press	399	279
43-355	3/4" Shaper 1 1/2 HP	950	685
43-505	1/2" Bench Router/Shaper	399	279
22-540	12" Bench Top Planer	595	389
36-220	10" Compound Mitre Saw	350	235

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33-990	10" Radial Arm Saw	727	585
37-280	6" Motorized Jointer	440	379
50-179	3/4 HP 2 stage Dust Collector	435	335
50-181	2 HP Dust Collector	760	605
22-667	13" Planer with 2 HP motor with stand & ext. wings	1750	1120
33-050	NEW 8-1/4" Sawbuck	742	535
33-055	above Saw complete w/legs	865	589
34-330	NEW 8-1/4" Table Saw 13A	321	235
34-985	1/6 HP Stock Feeder	698	489
32-100	NEW Station Plate Jointer	645	285
36-040	NEW 8-1/4" Cmpd Mitre Saw	216	165
34-897	50" Delta Unifence	500	349
36-755	NEW 10" Tilt Arbor Saw	1203	875

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0399-1	12V cdls Drill Kit complete	299	155
0402-1	above Drill w/keyless chuck	304	163
0395-1	9.6V cordless Drill w/case	279	148
0224-1	3/8" Drill 4.5A mag magnum	199	110
0234-1	1/2" Drill 4.5A mag 0-850 rpm	219	112
0244-1	1/2" Drill 4.5A mag 0-600 rpm	219	112
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	185	102
0228-1	3/8" Drill 3.5 amp 0-1000 rpm	179	99
0375-1	3/8" close quarter Drill	219	124
0379-1	1/2" close quarter Drill	249	147
6539-1	cdls Screwdriver 190 rpm	125	68
6540-1	6539-1 Driver w/bits & case	159	108
6546-1	cdls Screwdr 200 & 400 rpm	135	75
3102-1	Plumbers right angle Drill Kit	350	184
5399	1/2" D-hdle Hammer drill kit	319	179
1676-1	HD Hole Hawg with case	449	235
6511	2 speed SawZall with case	234	129
6750-1	Drywall gun 0-4000 5 amp	159	88
6507	TSC SawZall w/case	249	132
6170	14" Chop Saw 15 amp	479	259
6014	Orbital Sander 1/2 sheet	209	116
8977	Variable temp. heat gun	114	75
5397-1	3.8" var. spd Hammer Drill kit	239	137
5371-1	1/2" var. spd Hammer Drill kit	335	182
3107-1	1/2" var. spd rt angle Drill kit	360	190
6754-1	Drywall Gun 0-4000 5.4 amp	189	118
3300-1	1/2" var. speed rt angle Drill	319	179
5660	1-1/2 HP Router - 10 amp	325	185
5680	Router 2 HP - 12 amp	355	215
6215	16" Chain Saw	299	165
0235-1	1/2" Drill w/kyls chuck mag	219	125
6016	1/4 sheet Pad Sander	89	49
6145	4-1/2" Grinder 10,000 rpm	159	95
6142	6145 with case & accss	197	125
6749-1	Drywall Gun 0-2500 5.4 amp	209	118
5353	Eagle 1-1/2" Rot. Hammer w/case	995	525
6365	7-1/4" Circular Saw 13 amp	209	118
6367	above Saw - double insulated	205	120
6366	8365 w/lence & carbide blade	219	125
6368	6365 w/lnce,carb. blde,& case	239	134
6377	7-1/4" Worm Drive Saw	319	169

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LU82M010	Cut-off 10"	60	77	43
LU84M011	Comb 10"	50	65	38
LU85M010	Super Cut-off	10" 80	96	55
LM72M010	Ripping 10"	24	57	36
LU73M010	Cut off 10"	60	70	43
LU87M010	Thin Kerf 10"	24	60	37
LU88M010	Thin Kerf 10	60	74	43
LU98M010	Ultimate 10"	80	107	68
TK206	10" Framing	24	33	19.95
TK303	7-1/4" Finishing	40	36	21.25
TK306	10" Finishing	40	40	24.95
TK906	10" Combo	50	45	26.10
SD306	6" Dado - Carbide		184	109
SD308	8" Dado - Carbide		196	117
F0	1-3/4" x 5/8" Bisc. 1000 Qty		32	27
F10	2-1/8" x 3/4" Bisc. 1000 Qty		32	27
F20	2-3/4" x 1" Bisc. 1000 Qty		34	29
FA	Assorted Biscuits 1000 Qty		34	29
FB100	16 piece Forstner Bit Set		315	165
94-100	5 pc. Router Bit Door System		288	158
JS100	Biscuit Jointer with case		300	159
FT2000	3-1/4 HP Plunge Router		299	179

MAKITA CORDLESS

Model		List	Sale
6070DW	3/8" v/spd Reverse Drill 7.2V	130	78
6071DWK	above Drill w/removable batt.	199	115
5090DW	3-3/8" Saw Kit 9.6 volt	256	137
6010DWK	3/8" cordless Drill Kit 7.2V	164	95
5010SDW	3/8" cdls Drill Kit 7.2 volt	99	59
DA3000DW	3/8" Angle Drill 7.2 volt	251	137
4390DW	9.6 cordless Recip Saw Kit	230	125
6012HDW	2 speed Drill w/clutch-comp	236	125
6092DW	var. spd Drill, kit complete	250	127
6093DW	v/spd Drill w/clutch-complete	261	129
632007-4	9.6 volt Battery	48	30
632002-4	7.2 volt Battery	40	28
5007NBA	7-1/4" Saw w/electric brake	233	124
5008NBA	8-1/4" Saw w/electric brake	284	158
B04510	1/4 sheet Pad Sander	85	52
9900B	3" x 21" Belt Sander w/bag	268	144
9924DB	3"x 24" Belt Sander w/bag	282	145
9045N	1/2 sheet Fin. Sander w/bag	231	128
4301BV	Orb. var. spd Jig Saw 3.5A	289	155
JR3000V	var. speed Recip Saw w/case	227	124
LS1020	10" Mitre Saw 3.5 amp	463	289
9820-2	Blade Sharpener	373	195
1900BW	3-3/4" Planer with case	209	112
1911B	4-3/8" Planer 7.5 amp	240	137
1100	3-1/4" Planer with case	401	205
9207SPC	7" Sander/Polisher	276	148
3601B	1-3/8 HP Router	255	135
9501BZ	4" Grinder 3.5 amp	126	69
B04530	6" Round Sander	101	64
B04550	1/4 sheet Pad Sander w/bag	86	57
DA3000R	3/8" Angle Drill	270	148
HP2010N	3/4" var. spd Hmr Drill w/case	300	165
2708W	8-1/4" Table Saw	504	265
2711	10" Table Saw with brake	841	475
2030N	12" Planer/Jointer	3120	1699
1805B	5-1/8" Planer Kit with case	679	355
5005BA	5-1/2" Circular Saw	223	135
6404	3/8" Drill Rev. 0-2100 rpm 2A	104	58
6510LVR	3/8" Drill Rev. 0-1050 rpm	145	83
6013BR	1/2" Drill Rev. 6 amp	241	135
5402A	16" Circular Saw 12 amp	636	325
3612BR	3 HP Plunge Router	377	165
9401	4" x 24" Belt Sander w/bag	318	164
4302C	var. speed Orbital Jig Saw	302	159
5077B	7-1/4" Hypoid Saw	252	138
LS1440	14" Mitre Saw	721	435
LS1030	NEW 10" Mitre Saw	414	225
5007NB	7-1/4" Circular Saw 13 amp	209	112
3612B	3 HP Plunge Router sq/base	377	155
2012	12" Portable Planer	895	455
LS1011	10" Slide Compound Saw	842	445

MIL-ROUTE

MR1/MR-R1	System	329	279
MR1/T1	Router Table	139	109

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SN4	General purpose 2" - 3-1/2"	685	475
LS2	Pinner 5/8" - 1"	351	255
SKS	Stapler 5/8" - 1-1/2"	351	255
LS5	Pinner 1" - 1-1/2"	399	285

BOSTICH AIR NAILERS

N80C-1	Utility Coil Nailer	845	409
T36-50	Sheath & Decking Stapler	595	334
N12B-1	Coil Roofing Nailer	845	415
N60FN-2	Finishing Nailer	625	335
T31	Brad Nailer	270	152
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3810	10" Mitre Saw	263	225
3810S	3810 w/60 tooth Carbide Blade		245
77	7-1/4" Worm Drive Saw	230	144
2735-04	12 V var. spd cdls Drill,w/case,2 batt & extra special 5 pc bit set	210	135
1605-02	NEW Biscuit Jointer w/case	200	119

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EY6005B	12V cdls Drill w/1 hr charger	315	149
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TR12	Plunge Router 3 HP	354	174
F1000A12	Planer/6" Jointer	2835	1489
P100F	12" Planer	2005	1149
C10FA	10" Deluxe Mitre Saw	490	275
C12FA	NEW 12" Mitre Saw	586	319
C8FB	8-1/2" Slide Compound Saw	859	445
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73-759	8-1/4	40	44.65	24.99
73-719	8-1/4	22	19.65	11.95
73-715	5-1/2	18	13.70	7.99
73-740	10	32	32.98	15.95
73-770	10	60	67.02	29.95
73-711	10	50	65.08	29.95

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9850K Porter Cable cordless variable speed Drill Kit. Includes extra battery 288 165
7334K Porter Cable 5" Random Orbit Sander with case & 1 roll 100X & 150X discs 253 149
7335K Porter Cable 5" var. spd Random Orbit Sndr w/case & 1 roll 100X & 150X discs 273 159
7336K Porter Cable 6" var. spd Random Orbit Sndr w/case & 1 roll 100X & 150X discs 278 165
555K Porter Cable Plate Biscuit Jointer with case & 1000 assorted biscuits 339 189
JS100K Freud Plate Biscuit Jointer with case & 1000 assorted biscuits 351 184
1581VSK Bosch Top Handle Jig Saw with case & 30 Bosch blades 305 185
1582VSK Bosch CLIC Barrell Grip Jig Saw with case & 30 Bosch blades 305 185

BIESMEYER FENCES

B-50 50" Commer. Saw Fence 329 295
T-SQUARE 52 52" Homeshop Fence 249 235

WEDGE SMART LEVEL

SM-TR2	2 FT Level w/sensor	120	105
SM-TR4	4 FT Level w/sensor	150	134
SM-TR6	6 FT Level w/sensor	180	162
SM-PR2	2 FT Pro Level w/sensor and free case Special Sale		99.95

JORGENSEN I-BAR CLAMPS

Model	Size	List	Sale
7224	24"	27.11	16.95
7236	36"	29.10	17.95
7248	48"	31.96	19.75
7260	60"	35.60	22.85
7272	72"	37.30	25.29

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Open Cap	List	Sale	Box of 6
#0	8"	4-1/2"	18.63	11.95	62.95
#1	10"	6"	21.30	12.99	71.49
#2	12"	8-1/2"	24.45	15.95	81.89
#3	14"	10"	31.01	18.95	104.95
#4	16"	12"	40.30	24.89	146.85

JORGENSEN STYLE 37 2-1/2" Throat 1/4"x3/4"

Item#	Jaw Length	List	Sale	Box of 6
3706	6"	9.30	6.29	35.65
3712	12"	10.30	6.79	38.59
3718	18"	11.37	7.35	41.69
3724	24"	12.42	7.99	45.25
3730	30"	13.65	9.05	51.19
3736	36"	15.15	9.95	56.65

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
50	3/4" Black Pipe Clamps	13.10	7.89	84.99
52	1/2" Black Pipe Clamps	10.93	6.30	69.50

BOSCH

1581VS	Top Handle Jig Saw	239	132
1582VSC	NEW CLIC Barrell Jig Saw	245	132
	Bosch Metal Case for above Jig Saws	34	30
	Bosch blade assortment for Jig Saws 30 of Bosch's best selling blades	25.99	
1942	Heat Gun 600° - 900°	99	67
1272D	3" x 24" Belt Sander with bag	299	169
1273D	4" x 24" Belt Sander with bag	315	175
1290D	1/2 Sheet Sander with bag	209	115
11-212VSR	Bulldog 3/4"SDS Rtry Drill	339	194
1199VSR	1/2" var. speed Hammer Drill	229	133
1608	5.6 amp Laminate Trimmer	140	85
1608L	same as above w/Trim Guide	145	92
1609	5.6 amp Offset Base Trimmer	205	115
1609K	Lam Installers Kit with 1609	295	168
1601	1 HP Router	165	99
1602	1-1/2 HP Router	199	122
1603	1/2 HP D-handle Router	223	139
1604	1-3/4 HP 2 Handle Router	219	118
1604K	Same as above w/case & acc	269	165
1606	1-3/4 HP D-handle Router	243	145
3258	3-1/4" Planer w/blade guard	210	118
3270D	3" x 21" Belt Sander with bag	225	129
1273DVS	Var. spd 4" x 24" Belt Sander	339	189
1611	3 HP Plunge Router	349	198
1611EVS	3 HP variable speed Router	410	229

ELU BY BLACK & DECKER

Model		List	Sale
3338	2-1/4 HP v/spd Plunge Router	387	249
3304	1 HP var. spd Plunge Router	261	178
3375	3-1/8" Univ. planer 7.2 amp	280	158
3380	Biscuit jointer with case	485	245
4024	3 x 21 var. speed Belt Sander	289	188

BLACK & DECKER

1166	3/8" Drill 0-2500 rpm 4 amp	96	59
2600	3/8" Drill 0-1200 rpm 4.5 amp	125	84
1707	8-1/2" Crosscut Mitre Saw	813	445
1703	10" Mitre Saw w/73-770 blde	313	179
2694	NEW 7-1/4 Super Sawcat	242	149
2695	NEW 8-1/4 super Sawcat	265	159
4011	1/4 sheet Palm Sander	82	62

JET TOOLS

JBS-14CSN	NEW 14" Band Saw 1 HP	579	389
JTS-10	10" Table Saw w/std 1-1/2 HP	554	449
JJ-8	8" Jointer 2 HP	1252	945
DC610	1 HP Dust Collector	321	225
DC1162	2 HP Dust Collector	577	405
DC1883	3 HP Dust Collector	850	639
JJ-4	4" Jointer 1/2 HP	310	275
JJ-6CS	NEW 6" Jointer 3/4 HP	579	389
JWP-15H	15" Planer 3 HP	1565	1065
JWP12	12" Portable Planer	569	365
JSG-6	6" x 48" Belt & 12" Disc Sndr	634	485
JDP10	NEW 10" Bench Drill Press	209	165
JDP14M	NEW 14" Bench Drill Press	339	285
JDP17M	NEW16-1/2"Bench Drill Press	399	365
JDP14MF	NEW 14" Floor Drill Press	419	345
JDP17MF	NEW 16 1/2" Flr Drill Press	459	379
JDP20MF	NEW 20 1/2" Flr Drill Press	819	639

RYOBI SPECIALS

JP-155	5-1/8" Jointer/Planer	611	298
R500	2-1/4" HP Plunge Router	326	155
TS-254	NEW 10" Mitre Saw	397	198
TS-254K	above Saw with acc. kit & B&D 73-770 carbide blade	495	245
AP10	10" Surface Planer 13 amp	820	349
RA200	8-1/4" Radial Arm Saw	515	245
RE600	3 HP Plunge Router	398	205
BE424	NEW 4" X 24" v/spd Belt Sndr	340	169
BE321	3" x 21" var. spd Belt Sander	259	129
SC160	NEW 16" Bench Scroll Saw	260	145
TFD170VRK	9.6V cordless Drill Kit	254	145
TFD220VRK	12V cordless Drill Kit	279	165
JM100K	NEW Biscuit Jointer w/case	430	215
RS115	NEW4-1/2" v/sp Rdm Orb Sndr	134	79

LAMELLO BISCUIT JOINTERS

TOP 10	"Simply the Best"	699	559
STANDARD 10	"Professionals Choice"	499	399

PORTER CABLE

690	1-1/2 HP Router 8 amp	225	124
691	1-1/2 HP Router D-handle	245	135
695	1-1/2 HP Router/Shaper	310	198
696	HD Shaper Table	170	115
351	3" x 21" Belt Sander w/o bag	225	127
352	3" x 21" Belt Sander with bag	235	129
360	3" x 24" Belt Sander with bag	310	174
361	3" x 24" Belt Sander w/o bag	290	166
362	4" x 24" Belt Sander with bag	325	184
363	4" x 24" Belt Sander w/o bag	310	179
315-1	7-1/4" Top Hdle Circular Saw	195	114
9315-1	315-1 comp. w/cs & carb bld	225	129
617	7-1/4" Pushhandle Saw	195	114
9617	617 comp. w/case & carb blde	225	129
314	4-1/2" Trim Saw	215	124
9548	X HD Bayonet Saw w/case	290	195
9629	Recip Saw var. speed 8 amp	235	139
9627	Recip Saw 2 speed 8 amp	225	128
666	3/8" HD v/spd Drill 0-1200 rpm	185	119
621	3/8" HD v/spd Drill 0-1000 rpm	155	95
320	Abrasive Plane 3 amp	160	109
9118	Porta Plane Kit 7 amp	335	184
7545	0-2500 Drywall Gun 5.2 amp	189	104
505	1/2 sheet Pad Sander	195	112
7511	3/8" var. speed Drill 5.2 amp	185	108
7514	1/2" var. speed Drill 0-750 rpm	195	117
7548	Top Handle Jig Saw 4.8 amp	230	135
7649	Barrel Grip Jig Saw 4.8 amp	225	149
330	Speed Block Sander 1/4 sheet	97	55
555	Plate Biscuit Jointer w/case	299	165
345	6" Saw Boss 9 amp	170	98
9345	345 comp. w/case & carb blde	220	124
100	7/8 HP Router	165	95
5116	Omni-Jig	395	260
9647	TIGER CUB Reciprocal Saw	195	115
9850	12 volt cordless Drill w/case	230	135
9851	9850 with keyless chuck	230	135
8500	Extra 12 volt Battery	46	35
9637	Full var. spd Recip Saw &amp	240	134
7519	3-1/4 HP Router 2 Handle	399	224
7518	3-1/4 HP 5 speed Router	475	259
7536	2-1/2 HP 2 Handle Router	355	204
7537	2-1/2 HP D-Handle Router	375	215
7538	3-1/4 HP Plunge Router	399	224
7399	5.6 amp Drywall Cutout Unit	120	75
7310	5.6 amp Laminate Trimmer	145	85
7312	5.6 amp Offset Base Lam Trim	209	119
7319	5.6A Tilt Base Lam Trimmer	165	105
97310	Lam Trim Kit w/std, Base, Tilt Base, Offset Base, Slitter Base, Guide & Cs	330	185
7334	5" Random Orbit Sander	205	119
7335	5" var. spd Rndm Orbit Sndr	225	129
7336	6" var. spd Rndm Orbit Sndr	225	134
693	1-1/2 HP Plunge Router Base	280	165
6931	Plunge Router Base	120	75
7539	NEW3-1/4HP v/sp Plge Router	475	265
9505	**505 Commemorative Edition 1/2 sheet pad sander w/oak case**		139

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THREE FOR ME THREE FOR THEE

According to the U.S. Forest Service, there are approximately three acres of forest for every man, woman, and child in the United States. And what, you might say, does that get you? Well, from just one average acre of trees containing 1,720 cubic feet of timber (about 22 cords), you could produce:

- 20,724 one-pound books
- 1.35 million standard-sized envelopes
- 10 million personal checks
- 264 dining-room tables seating eight people
- 88,000 1-gallon milk cartons
- One 2,000-square-foot home

LIVE LONGER IN WOOD

A report from Japan's Shimane University indicates that people living in wooden structures outlive those living in concrete buildings by as much as nine years. As yet, the researchers don't know exactly why.

WOODWORKING DATABASE

Planning on a woodworking career? Need hands-on training to boost your skill level? The Institute for Woodworking Education (IWE), a wood-industry-sponsored project, can help.

Formed last year, the IWE acts as a clearinghouse for information about educational woodworking programs throughout the U.S., employment, and training-related funding sources. The I.W.E. also conducts or sponsors hands-on workshops for those employed in the industry. For information, write: IWE, 1012 Tenth St., Manhattan Beach, CA 90266. Or call 213/372-9640.

SKILSAW: A SUGARCANE ORIGIN

When the 10 millionth portable circular saw came off the line at Skil Corporation's Heber, Arkansas, plant last fall, onlookers couldn't have imagined that it all began in a Louisiana sugarcane field 80 years ago. But that's where the light bulb lit for the first such portable power saw.

One day, Edmond Michel, a New Orlean's inventor, happened to watch some field hands slashing thick, red, sugarcane stalks with machetes. That evening he retired to his shop and began developing a motorized machete blade. However, he soon decided that the cutter would be more effective if it rotated. By 1923, Michel had come up with the first small electric handsaw.

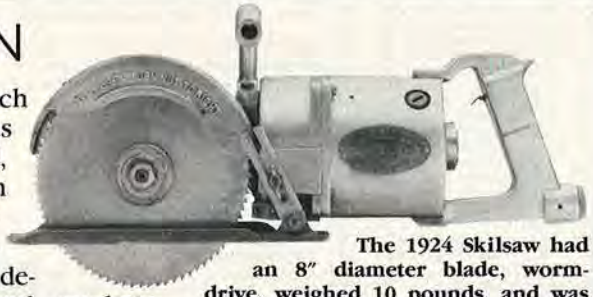
Later that year, a Minnesota land developer by the name of Joseph W. Sullivan read about the invention while en route to Florida. He headed for New Orleans.

Michel's first saw needed some beefing up. Driven by a salvaged motor from a malted-milk mixer, it hardly could rip a cigar-box lid. Sullivan and Michel agreed to make and market a sturdier model, but from Chicago.

On July 1, 1924, the present Skil Corporation was founded by Michel and Sullivan as the Michel Electric Handsaw Company. Their first customer was a Chicago contractor. He bought three prototype models, which seemed only to work a few days before breaking down. But necessary repairs and replacements were made, the contractor was enthusiastic, and the new company was launched.

Today, as a subsidiary of the Emerson Electric Company, Skil Corporation centers its manufacturing of portable circular saws at its Arkansas plant. And worldwide, the name Skilsaw has become the generic name for a portable circular saw on many job sites and in home workshops, regardless of the manufacturer.

Photograph: Skil Corporation



The 1924 Skilsaw had an 8″ diameter blade, worm-drive, weighed 10 pounds, and was rated at slightly less than 1 hp. It sold for about $160.

Illustrations: Jim Stevenson

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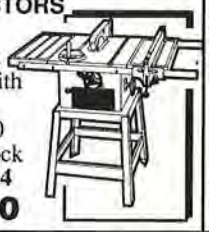
RYOBI 10" PLANER

Plane boards to 5" thick. Cut 1/8" per pass. Portable, weighs 58 lbs.

AP10
$345.00

DELTA 10" CONTRACTORS SAW

Large 40" x 27" table with 1-1/2" H.P. motor. 5500 RPM. Jet lock fence. 34444
$597.00



freud BISCUIT JOINER

Super strong joints. Eliminates dowels.

JS100
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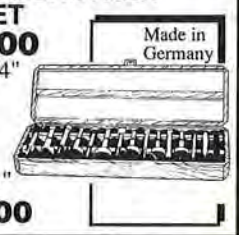
15 PC. FORSTNER BIT SET

$99.00

Made in Germany

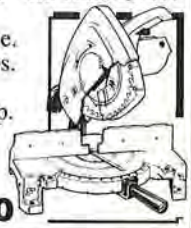
Sizes 1/4" to 2".

7 PC. SET: 1/4" to 1"
$47.00



RYOBI 10" MITER SAW

Electric brake. Positive stops. Superior workmanship.



TS251U
$167.00

DELTA UNISAW WITH 52" FENCE

Cut to the center of 60" board. Positive lock unifence.

Table Board Not Incl.

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$1649.00

freud 10" 60 TOOTH BLADE

Big carbide tips. Grind: ATB.

LU73M10
$31.00

29 PC. BRAD POINT SET

Sizes 1/16" to 1/2" in 64ths. Won't walk. Long lasting. With steel case.

$19.00

RYOBI CORDLESS DRIVER/DRILL

Torque force. Electric brake. One hour charge.

TFD150VR	7.2V	$ 99.00
TFD170VR	9.6V	137.00
TFD220VR	12V	165.00

DELTA 18" SCROLL SAW

Variable speed. Cut to 2" thick, 7/8" stroke. 36 blades included.

40601
$687.00

14" BAND SAW

3/4 H.P. motor. 4 speeds. Enclosed base.

$229.00

PORTER-CABLE DELUXE SANDER

1/2 sheet. Includes wood case. 10,000 orbits/minute.

9505
$134.00

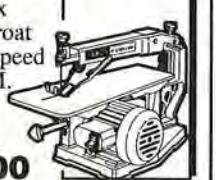
RYOBI 3 H.P. ROUTERS

3 H.P., 15 amp. Accepts 1/4", 3/8", 1/2" bits. Includes guides.

R600	$187.00
RE600	$215.00

DELTA 15" SCROLL SAW

Table 17" x 7-7/8". Throat 15" x 2". Speed 1725 CS/M.



40150
$117.00

Makita 3-1/4" PLANER

Cuts 1/16" deep. Includes rip fence.

1900BW
$109.00

Makita CORDLESS DRIVER/DRILL

9.6 volts. Variable speed. One hour charge.

6093DW
$125.00

MORE RYOBI

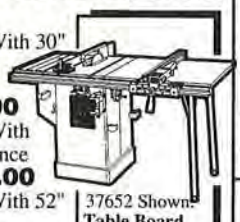
SC160	16" Scroll Saw	$137.00
E3800	Drywall Driver	69.00
TR30U	Laminate Trimmer	79.00
BT2500	Table Saw	279.00
DCU65	Drywall Cutout	69.00
JSE60	Jig Saw	125.00
W660	7-1/4" Circular Saw	89.00
R331	2 H.P. Router	153.00

DELTA CABINET SAWS

36755 With 30" Jet Lock fence
$869.00

36751 With 30" Unifence
$1049.00

36752 With 52" Unifence
$1165.00



37652 Shown. Table Board Not Incl.

66" ROLLER TABLE

15" wide. 9 ball bearing rollers. Fully adjustable. Folds for storage.

$99.00

AEG 3" X 21" SANDER

Electronic belt speed 660-1250 FPM. 7.8 amps.

HBSE75S
$127.00

Makita

6404	3/8" VSR Drill	$ 63.00
5090DW	Cordless 9.6V Saw	135.00
2708	8" Table Saw	269.00

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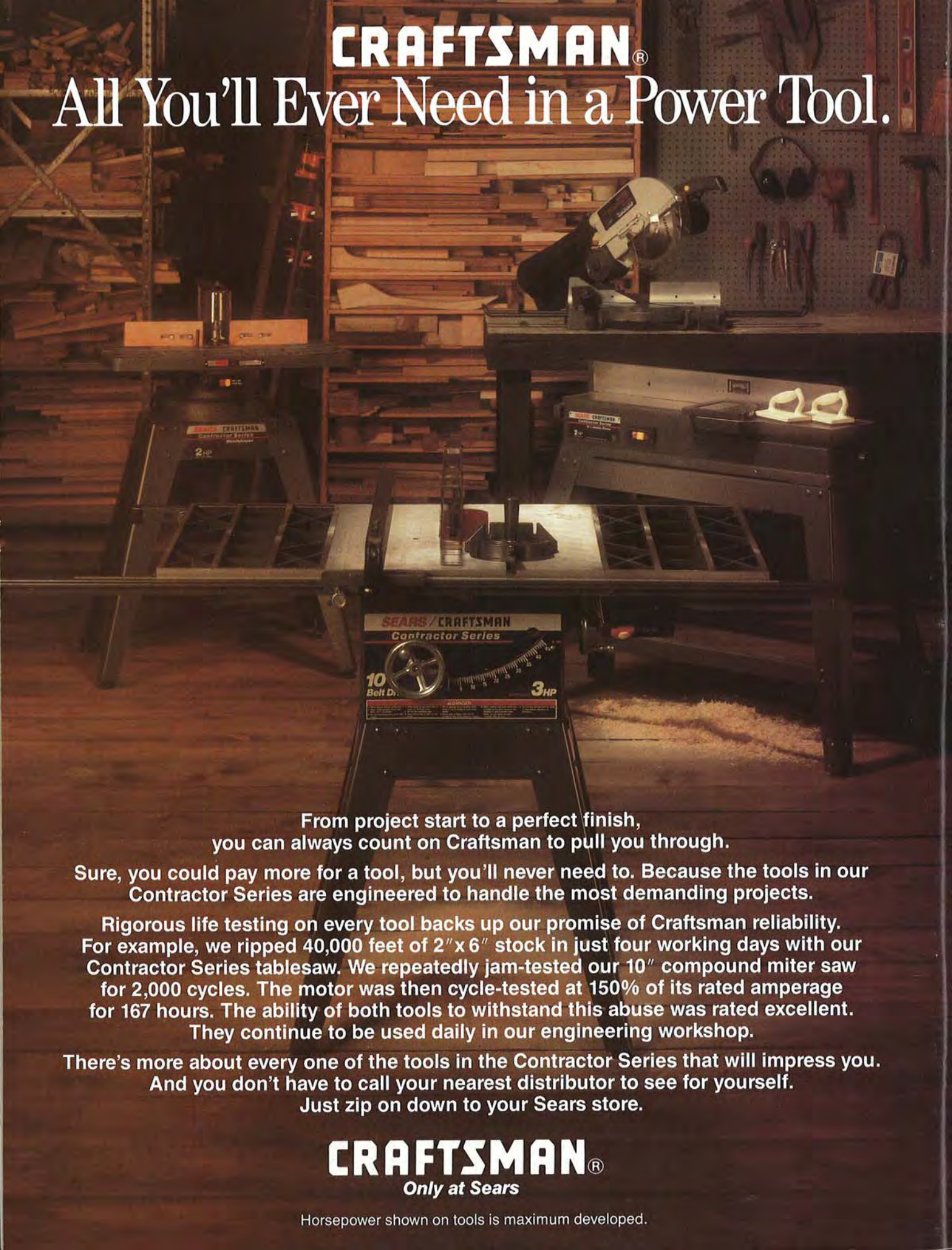

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Rigorous life testing on every tool backs up our promise of Craftsman reliability. For example, we ripped 40,000 feet of 2″ x 6″ stock in just four working days with our Contractor Series tablesaw. We repeatedly jam-tested our 10″ compound miter saw for 2,000 cycles. The motor was then cycle-tested at 150% of its rated amperage for 167 hours. The ability of both tools to withstand this abuse was rated excellent. They continue to be used daily in our engineering workshop.

There's more about every one of the tools in the Contractor Series that will impress you. And you don't have to call your nearest distributor to see for yourself. Just zip on down to your Sears store.

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